MODEL AIRPLANE NEWS

25 CENTS
OCTOBER 1948

MODEL MONOCOUPE—Scale Controliner

PAGE 11

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"Win your wings" with Testor's new control-line sensation . . . the TC-2 Trainer! Here's a plane that's quick and easy to assemble because *all parts are pre-shaped . . . no carving required.* And it's equally as easy to fly! Now you can learn to "take the stick" and solo a model plane without fear of its being too tricky to handle. The TC-2 is engineered and designed for flight stability . . . is ideal for practicing take-offs, straight-line flight, and for shooting landings. It's excellent as a primary or basic trainer with Class B engines . . . gives experts an opportunity to improve their flying technique through the use of larger Class C engines. Priced for *your* pocket? You can bet on that . . . only $2.95 for the entire kit! Be first in your neighborhood to fly Testor's TC-2 . . . your dealer has it in stock!

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AIR FORCE has confirmed the oft-reported rumor that the Bell XS-1 has flown faster than the speed of sound, not once, but on many occasions. Thus an era in aviation has drawn to a close and an entirely new one born: the "supersonic age." The tiny, rocket-powered craft has been flown faster than the speed of sound by Air Force Capt. Charles E. Yeager, Maj. Gus Lundquist, Capt. James Fitz-Gerald and NACA reasearch pilots Herbert H. Hoover and the late Howard Lilly, who was killed recently in the takeoff crash of the Douglas D-558-I *Skystreak* research airplane. Yeager, the first man to fly faster than sound, was awarded the Mackay Trophy, a special Air Force award for the outstanding flight of the year, and an Oak Leaf Cluster to his Distinguished Flying Cross, which he won in the course of running up a string of 13 victories as a fighter pilot in Europe. All the other pilots received the Air Medal.

IN AN INTERVIEW with both Yeager and Lilly, *Flash News* learned that all the difficulties predicted by wind tunnel tests and theoretical calculations materialized at the sonic barrier, but the extent of the difficulties remain a closely-guarded military secret In other words, shock waves formed and the stability and control of the airplane was adversely affected through the barrier, but *how much* they were affected is just the sort of information other nations would like to have. The flights began at 30-35,000 ft. at which point the orange speedster cut loose from its Boeing B-29 "mother plane." The first rocket motor (there are four) was cut in and the tiny craft headed skyward. The other rocket motors were fired until the full 6000 lb. thrust was available. And then: that magic figure Mach number 1.0 was passed and the pilots were in the supersonic realm. When the fuel supply was exhausted (2½ min.

(*Turn to page* 52)

NATIONALS WINNERS!

The following unofficial results were rushed to press in time for this issue. We list only first place winners (see Nov. issue for more complete results). All free flight times are in seconds, while control speed results are in mph; radio control, flying scale and stunt events include points of the winners.

Grand Nats Champion—B. Holland, Sunland, Cal. *Nats Club Championship*—Oakland Cloud Dusters. *PAA-Load Event*—H. Kothe, Omaha, Nebr. *Radio Control*—J. Walker, Portland, Ore., 193. *ROW (combined class)*—B. Holland, Sunland, Calif., 489.8. *Wakefield Team*—T. Corryell, R. Schumacher, R. Korda, J. Bunton, R. Holland, J. Cahill. *Jet Speed*—H. De Bolt, 133.3. *Flying Scale Rubber*—P. Gilliam, Glendale, Calif., 70.8 pts. *Multihill Stick Sr.*—P. Nishanian 908.0; *Jr.*—H. Snavely 385.1. *Rubber Powered Cabin Open*—M. Andrade, Oakland, Calif., 785.9; *Sr.*—W. R. Ehrlich, Chicago, Ill., 747.8. *CO2 Open*—M. Shammo, Fremont, O., 697.3; *Sr.*—E. Rodensky, Detroit, Mich., 448.6; *Jr.*—L. Erickson, Omaha, Nebr., 295.0. *Outdoor Cabin Open*—M. Andrade, Oakland, Calif., 785.9;*Jr.*—W. Elerlich, Chicago, Ill., 747.8; *Jr.*—R. Truelson, Los Angeles, Calif., 264.6. *Outdoor Stick Open*—R. Bienenstein, 821.3. *Outdoor H-L Glider Open*—D. Davis, San Diego, Calif., 324.8; *Sr.*—C. Haas, Chicago, Ill., 239; *Jr.*—Charles Sotich, Chicago, Ill. *Towline Glider Open*—C. Lindsey, Kansas City, Mo., 771.5; *Sr.*—B. Fox, Boulder, Colo., 610.3; *Jr.*—R. Truelson, Los Angeles, Calif., 147.3. *Indoor Cabin Open*—W. Erbach, Lincoln, Nebr., 16:26.0; *Sr.*—G. Xenakis, Detroit, Mich., 6:19.0; *Jr.*—J. Butler, Inglewood, Calif., 0:15.0. *Indoor Stick Open*—W. Atwood, Glendale, Calif., 25:00.1; *Sr.*—D. Kennedy, Glendale, Calif., 22:23.0; *Jr.*—C. Sotich, Chicago, Ill., 8:56.8. *Indoor H-L Glider Open*—M. Demos, Oakland, Calif., 1:03.0; *Sr.*—A. Lo Castro, Oakland, Calif., 54.8; *Jr.*—B. Gelvin, Topeka, Kansas, 248.2. *Prec. Stunt Open*—J. Saftig, San Diego, Calif., 382.5; *Sr.*—B. Arnett, Hoisington, Kan., 388.5; *Jr.*—D. Slagle, Burbank, Calif., 369.5. *Novelty Stunt Champ.*—D. Slagle, 249.5. *Class A Speed Open*—H. D. DeBolt, Williamstown, N. Y.; *Sr.*—D. Rigney, Long Beach, Calif.; *Jr.*—B. Carnes, Neosha, Mo. *Class B Speed Open*—T. Grish, St. John, Ind., 137.93; *Sr.*—M. Stanglin, Dallas, Texas, 128.52; *Jr.*—E. Hill, Kansas City, Mo., 118.42. *Class C Speed Open*—D. Newberger, 136.0; *Sr.*—M. Stanglin, 140.48; *Jr.*—B. Kreider, 129.72. *Class D Speed Open*—W. Thomas, Lawrence, Calif., 151.3; *Sr.*—P. Hubert, San Marino, Calif., 140.6; *Jr.*—E. J. Schwarz, Little Rock, Ark., 138.5. *Class A FF Gas Open*—M. Shammo, 1134.9; *Sr.*—J. Norris, Lakewood, O., 838.8; *Jr.*—B. Gelvin, Topeka, Kan., 491.7. *Class B FF Gas Open*—R. H. Arland, 848.4; *Sr.*—J. Norris, 727.9; *Jr.*—L. Erickson, 865.0. *Class C FF Gas Open*—W. Parmenter, Lincoln, Nebr., 775; *Sr.*—W. Burgess, Muncie, Ind., 1000.3; *Jr.*—J. Butler, Inglewood, Calif., 398.5. *Class D FF Gas Open*—J. Brofman, Ozone Park, N. Y., 1112.9; *Sr.*—D. Reber, Muncie, Ind., 1184.2; *Jr.*—V. Webber, Houston, Tex., 664.12.

Stout Indoor Trophy—Don Kennedy, Glendale, Calif. *Springfield Trophy*—Bill Atwood, Glendale, Calif. *Bloomingdale Indoor Trophy*—Walter Erback, Lincoln, Nebr. *Wakefield Open*—R. Schumacker, Reseda, Calif., *Sr.*—Tom Coryell; *Jr.*—Jack Butler, Inglewood, Calif. *Junior Nats. Champion*—Charles Sotich, Chicago, Ill. *Senior Nats. Champion*—Jack Norris, Lakewood, Ohio. *Berkeley Novice Award*—Bill Fox, Boulder, Colo. *Precision Stunt A Open*—H. De Bolt, Williamsville, N.Y., 348; *Sr.*—Bob Arnett, Hoisington, Kans., 256.5; *Jr.*—Craig Woodson, Brownwood, Texas, 147. *Precision Stunt B Open*—Jim Saftig, San Diego, Calif., 382.5; *Sr.*—Bob Arnett, Hoisington, Kans., 388.5; *Jr.*—Lawrence Goodale, San Diego, Calif., 366.

MODEL AIRPLANE NEWS

JAY P. CLEVELAND
Publisher

Serving Aviation 20 Years

OCTOBER 1948 VOL. XXXIX—No. 4

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COVER—Champion Bob Bienenstein (Grosse Pointe Park, Mich.) launches his indoor model at Michigan meet to select entries for Plymouth 2d International Model Plane Contest. (*Photo courtesy of Plymouth Motor Corp.*)

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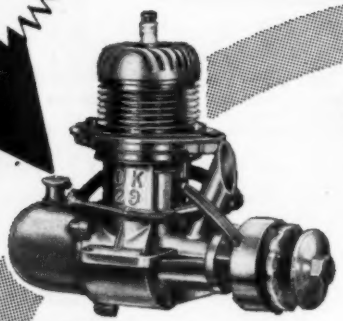
"O.K." Consistent Winners



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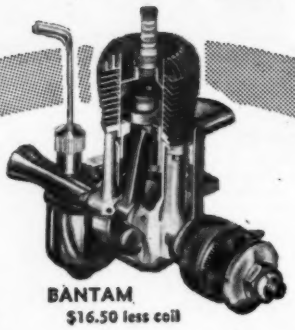

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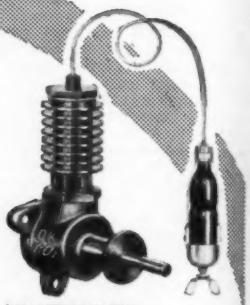

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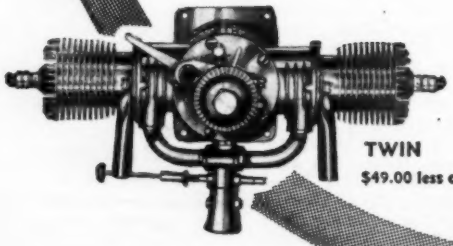

TWIN
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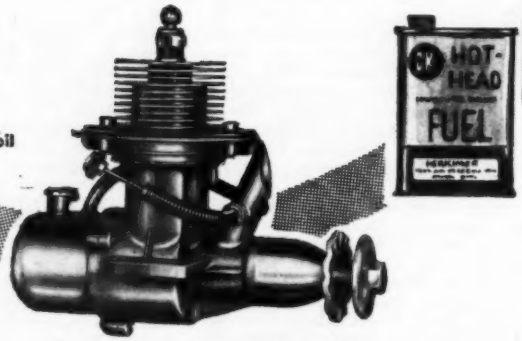

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Super 29	.299	.760	.660
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Twin	1.208	.900	.950
CO_2	.0178	.275	.300
Hot-Head	.299	.760	.660

*Super 60 also available in Raceway-Marine model equipped with flywheel. Price $23.00 less coil.

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record after record

SOME RECENT "O.K." WINNERS

FREE FLIGHT GAS — RISE OFF WATER
Class A, Open record time of 3:13.0 (3 flight average) established by Paul Salake, Hampton, Va. on December 8, 1947 with a Bantam.

CONTROL LINE SPEED GAS MODELS
Class A, Senior record speed of 107.48 mph established by Maurice Stenglin, Dallas, Texas on February 10, 1948 with a Bantam.

COMPRESSED GAS (CO_2) MODELS
Combined class, Open record time of 14 min., 54 sec. (3 flight total) established by Joe Dodson, Hampton, Va. on March 4, 1948 with an "O.K." CO_2

CONTROL LINE SPEED GAS MODELS
Class A, Open record speed of 97.47 mph established by John Kasserman, Knoxville, Tenn. on March 9, 1948 with a Bantam.

FREE FLIGHT GAS MODELS RISE OFF GROUND
Class A, Open record time of 11:20:8 (total, 2 flights) established by Marjorie A. Watkins, Oakland, Calif., on April 11, 1948, with a Bantam.

And these are just a few recent winners announced by the AMA Contest Board . . . authentic proof that "O.K." consistently powers the champions. Watch this column in future issues for the latest records set by "O.K."powered models. So if you want championship performance,you're on your way when you say "O.K."

"O.K." ENGINES

SCRAP BOX

By BILL WINTER

Allen Trainor — the Los Angeles free flighter who took combined A and B, and the Sweepstakes as well, at the Bakersfield contest earlier in the year with a three-flight total of 30 minutes—believes that the majority of hand launched glider contests are won by the guy who can throw the hardest, either indoors or outdoors. In gas, at least, a fellow can buy a good engine and cross his fingers. But in hand launched glider the chap with a glass arm never wins anything. Who hasn't heard of Oakland's Rambo, aptly known as "the Arm?"

"My idea," says Trainor, "is to equalize the situation by the simple expedient of a catapult launch for the event instead of the old groan and grunt system. My catapult glider will outfly any hand launched glider and I don't have to have my arm in a cast for two weeks after flying. The average size of hand launched is about 40-55 sq. in. This size will go up just as high by catapult and the smaller ones are the altitude grabbers. The Class C glider is large for the catapult but it is also large for efficient hand launching—or have you tried to launch a 101 square incher? In short," Trainor argues, "the classes should be set up with a limited amount of rubber for each class. In this manner, the junior would be on the same footing with Bob Feller and things would be more fair."

* *

J. C. "Madman" Yates tells us that he and Henry Orwick are going into production on one-bladed stunt props as soon as their new building is completed (by now it should be done). These props work very well on stunters, claims Yates. Stunt men may be interested in J. C.'s reasons for the NACA 0018 airfoil used on the Madman. According to Yates it has superior stall characteristics to other symmetrical sections, also lots of lift, plus low drag.

* *

Hank Cole, the Seattle boy who hates polyhedral and loves flying wings, has an argument for the chute type dethermalizer which will confound you pop-up tail rooters. "Last Sunday," he says, "the chute dethermalizer on my B job got a real workout. I had it set for 3 minutes and it worked perfectly on the first two flights. On the third flight the timer got stuck and the job kept going up. At 10 minutes, at which point my tongue was dragging, the job was a mere speck well out over the forest. Suddenly it started to come down. The chute had finally popped out. We found the job about a mile back in the forest atop a tall tree, some 150 feet up—about 500 feet down if you have ever climbed a tall tree. Two of us climbed the tree and by lowering the model step by step with the long parachute cord got the ship down without a hole in the covering. Also, the white chute in the tree materially aided finding the model in the first place. I'd like to know what the pop-up tail boys have to say to that!"

* *

W. L. DeGinder, an M.D. at the Medical College of Virginia, thinks he is the only medico in the state who pours castor oil from a can instead of a tablespoon. "I am also certain," says the doc, "that I am the only one with a black fingernail from try-

(*Turn to page 40*)

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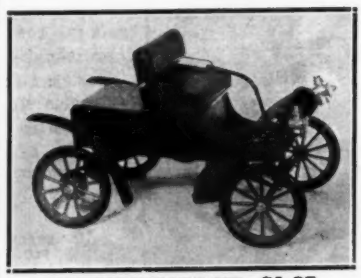

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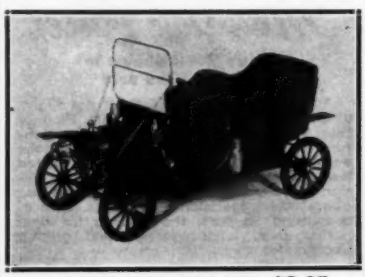

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REPORT FROM THE WEST

by "Tip" Hannon

Allan Trainor (center)—ardent freeflighter who took up U-control for extra points—with Bill Craney, left, and Johnny Acker, head of L. A. A. M.

JUNE 25 through 28 saw the second annual Western States Open, again in Los Angeles. Some time has passed since then and many comments regarding the Open have been tossed around. It was more than just a Sunday meet, and taking all things under consideration we think the meet went off quite well.

Los Angeles, sadly enough, doesn't have the facilities to put on a first class meet. When you consider that the Open was presented in four different localities, there couldn't be a great number of spectators at any one of them.

Western and Rosecrans Field copped top honors for spectator interest. Few saw the ROW at Main and East Roads. A fair to middling crowd trekked out to Santa Ana Air Base for the indoor. Santa Anita trailed.

Difficulties arose from the original planning. Sponsors were lacking and the bulk of the work fell on the Los Angeles Junior Chamber of Commerce. We must doff our hats to the Junior Chamber—under all the trying conditions, they pitched in and came up with a meet that was all around pleasing, and definitely an improvement over the previous year's attempt.

Many asked why the three dollar entry fee? It was simply this: with no sponsor, the bulk of the financial cost had to be assumed by the entrants. No other way to do it than to boost the entry fee to three dollars.

Other clubs might take a tip from the Los Angeles version of the Western Open. They scaled their entry fees this way: Juniors paid $1, seniors, $2, expert and open, $3. Prices have spiraled in all phases of living and model meets are no exception now.

As the number of annual meets of this type increases, no doubt they will be better run and better managed. Despite all the unfavorable comment, Tom Engleman, the meet manager deserves a lot of credit. And modelers in the South West owe a vote of thanks to the Plymouth Motor Corp. for their contribution.

Talking to many of the spectators lined up around the Western and Rosecrans flying field, we learned that they were disappointed to discover so few entries from out of town. One visitor from the North

(*Turn to page* 9)

(Right) The old master, Frank Cummings, readying his micro job for flight. In background, speed merchant Keith Storey watches the fun. "Too slow," sez Keith

(Below) Ray Acord gets one away. The ship is an original design using clipped Sailplane wings. The engine? Air-O-Midget, of course!

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6. Insulated coil holder
7. Correct size prop
8. Presto engine starter
9. Complete instructions
10. Plug gauge set
11. Battery box
12. Slide switch
13. 50 page engine manual
14. 4 mounting bolts
15. 4 mounting nuts
16. 4 wiring lugs
17. Champion Spark Plug
18. Identification tags
19. Motor cover
20. Speed indicator
21. Log book
22. Trouble shooting chart
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Aero Puppet 26" B-C-D	5.95
Art Chester Racer 19½" A	3.95
Atomic 19½" D	3.95
Baby Cinch 30" B-C	2.50
Baby Misbehave 24" A-B	2.95
Baby Sky Bee Trainer 24"S.B.	2.95
Baby Sky Bee Stunt 24" A-B	3.25
Baby Y Shark 20" A-B	2.95
Benton Sqt. 17½" A-B	2.75
Benchcraft 40" B-C-D	5.95
Ben Rosario Pete 30" B-C	5.95
Berkeley Controliners:	
Bet 32" C-D	4.95
Brescut 35" C-D	5.95
Bee 26" B	2.95
Bug 17" A	2.95
Buster 24" B-C	2.95
Buster Super Fury 24" A-B	2.50
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Nevion 25" A	3.95
Pet Thunderbird 40" C-D	7.95
PSI Mustang 32" A-B	7.95
Super Zilch 52" C-D	9.95
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Big Cut-up 48" B-C	5.95
Pipe Stunt Trainer 23" B-C-D	3.95
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Butch Trainer 28" B-C-D	4.95
Buzz 30" C-D	8.95
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Capitol 400 24" B-C-D	4.95
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Capitol Nevion 40" B-C-D	7.50
Cessalair 45" B-C-D	14.75
Cheap Autogiro 34" B-C-D	4.75
Cliffs Trainer 27" B-C	3.95
Competitor 26" C-D	4.95
Cyclone 36" B-C-D	4.95
Deco Spl. 24" C-D	7.95
Deco Spl. Jr. 16" A-B-C	3.95
Dreamer 20" B-C-D	7.50
Dronette 35" B-C-D	3.50
Duraplane 26" B-C-D	12.50
Falcon Speedster 25" C-D	7.95
Falcon Trainer 27" B-C-D	3.95
Fireball 36" B-C-D	7.95
Flutter Jet 32" A	3.95
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Formercraft 50" A-B	2.00
Formercraft 29" B-C-D	12.50
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Hot Rock 38" B-C-D	3.95
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Liquid Dynamite 13" A-B	1.50
Little Cut-up 36" B-C-D	3.95
Mercury 72" C-D	5.95
Miss Bobbette 34" B-C-D	4.95
Mite Bee 24" A-B	2.95
Monocoupe 36" B-C	3.95
Mr. Mulligan 22" A	2.95
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New Look 22" A-B-C-D	3.95
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Pacific Bi-Line 28" B-C	3.95
Paragon 21" C-D	4.50
PDQ Answer 17" A	1.50
PDQ Jr. 30" B-C-D	3.50
PDQ Sportscope A-B	5.00
PDQ Sr. B-C-D	7.50
Perky Pixie 18" A	2.95
Piper Cub 35" A-B-C	3.95
Pipe Shytpole 36" B-C-D	3.95
Pirate 40" B-C-D	3.95
Pirate Liner 30" A-B-C	2.50
Rouse Trainer 36" B-C-D	4.95
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Sharkster 30" B-C-D	4.95
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Sky Bee Stunt 42" B-C-D	4.95
Skystreak 16" A-B	1.95
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Sooky 34" A-B-C	3.95
Super Sooky 40" C-D	5.95
Speedwagon 15" A	2.95
Speedwagon 19" C-D	4.95
Squirt 25" (jet)	3.95
Stardust 26" B	4.95
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Stunt Ace 40" A-B-C	5.95
Stunt Scale Navion	2.95
Stunt Trainer 36" B-C-D	4.95
Super Cat 36" B-C-D	3.95
Super Sioux 36" B-C	3.95
Super Solution 18" A	2.95
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Topper III 20" B-C-D	3.00
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Trainer 28" B	2.95
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Trainer Sr. 32" B-C-D	4.75
Tyro 26" B-C-D	3.50
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Zouave 66" B-C	6.95

FREE-FLIGHT PLANES

Aero Champ 46" A	2.00
Airfoiler 44" B-C	3.95
American Ace 36" A	1.50
American Ace 54" B	3.95
Ardent Air 32" A	2.95
Baby Quaker 35" A	2.00
Banshee 50" A-B	2.00
Banshee Luxe 50" A-B	6.95
Bay Ridge Wiko 49" A-B	2.00
Bee 48" A-B	3.95
Brigadier 38" A	1.95
Brigadier 58" B	3.95
Bronklyn Dodger 36" B	3.95
Buccaneer 36"	1.95
Buccaneer 48" A-B	3.50
Buccaneer B Special 54" B	3.95
Buccaneer C Special 72" C-D	6.95
Buccaneer Std. 66" C-D	5.95
Buccaneer Super 90" D	9.95
Cavalier 60" C-D	5.95
Cavalier Custom 108" D	17.95
Cavalier Custom Twin 108" D	20.00
Comet Interceptor 42" A-B	2.95
Coronet 46" A	2.95
Crusader 48" B	7.50
Easterner 66" A-B	7.50
Flamingo 72" B	9.95
Good News 30"	1.50
Honey Bee 40" B	3.95
Hunlinger 52" B	3.95
Jersey Javelin 48" A-B	4.50
Jiffy 36" A	1.50
Larkey 50" B	3.50
Luscombe Sclesaire 42" A-B	3.00
Megow Piper Cub 52" B	4.50
Mercury 32" 50" B	3.95
Mercury 72" C-D	5.50
Miss Tiny 48" B-C	3.95
Musketeer 42" A	2.50
Musketeer 54" B	3.50
Musketeer Std. 72" C-D	4.95
Racer 53" B	3.95
Racer 60" C	4.95
Piper Super Cruiser 84" D	17.50
Pirate 42" 50" B-C-D	3.95
Playboy Baby 32" A	1.00
Playboy Jr. 50" B	3.25
Playboy Sr. 70" C-D	6.00
Powerhouse 42" A	3.95
Powerhouse 54" B	5.95
Powerhouse 62" C	5.95
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Roamer 45" A-B	2.95
Rocketeer 40" A-B	2.50
Runt 46" A-B	2.95
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Skylo 66" C-D	6.95
Skyhuggy 36" A	2.95
Stratchet 26" B-C-D	4.95
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Speerhead Sr. 60" C	3.95
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Stratus 42" A	2.95
Stratos-Streak 40" A-B	2.95
Sunduster Sp. 66" D	6.95
Super Quaker 76" C-D	7.95
Topper 41" A-B	3.50
Vagabond 74" C-D	5.50
Wanderer 54" B-C	3.50
Westerner 56" A	3.50
Westland Hawk 24" B-C-D	4.50

ENGINE ACCESSORIES

PROPELLERS

Plastic-Tornado

12" to 16" 11" 13" 15" 16"	.35
15" - .50, 16" - .75	.75
Small Finished 8" & 9" - 10" in 1"	.50
10" 12" or 14" pitch 5 for	1.00
Bi-Ball	
9" 10" 11" 12" 13" 14" -	.35
Rite Pitch	
Lil' Zilch 6" 8" 10" 11" in 6" 8" 10" 12" pitch -	.90
Traveler Prop. (pr) 14" or 16" pitch -	.60
Super Screw Pusher 14" 16" in 8" 10" 12" pitch -	.60
Joyce Plastic (low pitch) 6" 7" 8" -	1.00
Arden 8" 4" pitch Supercrew -	.35

IGNITION ACCESSORIES

Flag wire -	.25
Hi-Tension Clips -	.10
Sheet Copper (12"x12") 1/64" -	1.60
1/32" -	2.40
Plywood (6"x12") 1/32" -	.25
1/16" -	.25
1/8" -	.35
1/4" -	.35
Masking Tape 1/4"x36 yds. -	.25
3/4"x30 ft. -	.25

U-CONTROL ACCESSORIES

10 lb. Braided Nylon 55 ft.	.60
Stainless Steel Wire 100 ft.	.60
200 ft.	.50
Stranded Speed Wire 50 ft.	.50
75 ft.	1.15
100 ft.	1.85
200 ft.	3.00
Perrycraft Swivel Tank	3.00
U-Boely Control	9.50
U- Boely Remote	12.50
Con Control Handle(pistol grip)	2.50
Hand Gun Control Handle, Bent	2.00
Hand Gun Control Handle	1.95
Control-it Elev. control unit	1.95
Hand Control handle	.15
Metal Handles - 1.00 &	1.25
Hand Control Reel 24"	1.25
E-Z Hand Control Handle	2.25
Simplex Handle & Reel	1.25
Metal Flight Reel	1.25
Reel, Handle, Crank kit 1.00 &1	.25
Stunt Bellcrank & Elev. horn	.25
Control Assem.(bellcr. & horn)	1.25
Elevator control horn	.25
Aileron (bellcrank) 2"	.25
3"	.15
Speed Indicator Tables	.10
Elevator hinges 4 for	.10
Swivels, small .15 pr., large	.25
Adjustable Push Rod set	.25
Take-off Daily kit	1.00
2 Speed Relay	2.00

FLOAT KITS

22" length	1.00
30" length	1.50
41" length	2.50

CO2 PLANES, CARS & ACCESS.

All American 45"	1.00
American Ace 30"	1.00
Buccaneer 30"	1.00
Buzz CO2 Prop	.25
Campus Props	.20& .40
Flame 33"	1.50
CO2 Cartridges	.50
Firefly 36"	1.75
Flee 36"	1.75
Cad-jet Racer for O.K.CO2	1.50
Cad-jet Racer CO2 engine and	5.95
Locomotor 30"	1.00
Magna Spl.	1.95
O.K. CO2 Prop .35, .50 and	.75
Porky 29"	1.50
Powerhouse 25"	1.50
Stinson Voyager 30"	1.50
Zipper 2 .15	1.00

RADIO CONTROL

Good Brothers	69.50
Bell 2 Channel	120.00
Aero-Tronic	49.50

RACE CARS

McCoy Invader, Hot Rod or Streamliner	42.50
Dooling	45.00
Revhi	34.95
(also complete accessories)	

THIMBLEDROME & ACCESSORIES

Thimbledrome Race Car	3.95
Monument Drive Unit	9.45
Lucas & Smith Drive Unit	8.50
Micro Conversion Kit	2.50
Micro Conversion Unit	1.95
Arden Conversion Unit	4.95
Wasy's Conversion Unit	3.00
Prom T.D. tank	1.00
Two Seat-Prom, tires (pr.)	
Free running 2"-1.20;	1.25
3"-1.50;	1.50
Drive Type 2½"	1.15

MISCELLANEOUS

No. 70 Engine oil, 3 oz. -	.25
pint -	.60
Presto Disc Starter	.25
Coil Holder	.25
"Beanie" Starter	3.50
Jon Pump Can	.75
Tiger Fuel Pump	.60
Fuel Filter Fuel Can	.25
Fuel Line Filter	.25
Motor Cover	.50
Widget Screw Driver	.10
Metal Motor Mounts - small	.50
large	.75
Neoprene Tubing, per foot	.10
Transparent	.15
Vibrator Engine Tachometer	2.00
Gasket sheeting per sq.	.25
Gasket Paper	.25
Plug Wrench, 3-way	.25
4-way	.25
Socket Plug Wrench, 4-way	.50
Universal Needle Valve	.25
flexible	.75
Needle Valve Extens. flexible	.75
Log Book	.25
Extension Shaft 4½"	2.00
Bolts & nuts, 6", 1" or 1½" 12-	.25
Lock washers, lg. or sm. 12 -	.10
D-E Fuel Shut-off Valve	1.00
Engine Speed control (L or R)	1.95
1/8" Dia. Copper Tubing, ft.	.05
Plastic Fuselage 19", set of 2	2.50
(Please state colors) 20"x26"	3.95
Silkspun, light 18"x24" -	.05
heavy 26"x36" -	.25
Bamboo paper, 25"x36" - white	.10
blue, green -	.10
Cement (tube) .15 &	.25
Wood Stripper	.25
Landing Gear J-bolts, 4 for	.25
Landing Gear washers J-32" or 1/8", 12 for	.05
Celluloid 8"x 10" -	.10
Washers, 3/8" 12 for -	.05
1/2" 12 for -	.05
Ball Bearing Washers 1/4, 3/8	.10
Plastics Box	.10
Fillet Foil	.35
Wood Coiler & Bob, - pr.	.25
Alum. Tubing, 1/16",1/32",1/8" - 15 pr.ft.	
(per ft.) 3/16", 1/4" -	.20
Copper Tubing 1/8" OD, per ft.	.20
Brass Tubing 1/16", 3/32",1/8"	.15
Sheet Aluminum (sq. ft) .010" -	.35
.020", .55; .032", .75; .064"	1.25
Sheet Brass (3"x12") 1/64" -	.20

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Dronette 35" B-C-D	3.50
Duraplane 26" B-C-D	12.50
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Sharkster 30" B-C-D	4.95
Sky Bee Trainer 38" B-C-D	3.95
Sky Bee Stunt 42" B-C-D	4.95
Skystreak 16" A-B	1.95
Sofu Racer 40" C-D	7.95
Sooky 34" A-B-C	3.95
Super Sooky 40" C-D	5.95
Speedwagon 15" A	2.95
Speedwagon 19" C-D	4.95
Squirt 25" (jet)	3.95
Stardust 26" B	4.95
Streamline 25" B-C-D	3.95
Stunt Ace 40" A-B-C	5.95
Stunt Scale Navion	2.95
Stunt Trainer 36" B-C-D	4.95
Super Cat 36" B-C-D	3.95
Super Sioux 36" B-C	3.95
Super Solution 18" A	2.95
Super Y Shark 24" B-C-D	3.95
Super Zilch 30" B-C-D	10.75
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Thunderbird 22" C-D-E	10.95
Thunderbolt P47N 42" B-C-D	4.95
Tiger Shark 36" C-D	4.95
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Topper I 18" A-B	2.50
Topper III 20" B-C-D	3.00
Topping 100 21" B-C-D	10.00
Trail Blazer 24" B-C-D	4.95
Trainer 28" B	2.95
Trainer Jr. 25" A-B	3.75
Trainer Sr. 32" B-C-D	4.75
Tyro 26" B-C-D	3.50
Vee Gee 36" B-C-D	10.00
Zombie 44" A-B	2.50
Zouave 66" B-C	6.95

This Month's Special

PRESTOLINER only $3.95

Regularly $5.95

The boy of the month. Class A, B or C speed control-liner kit with prefabbed parts. Tiny plastic fuselage, preshaped wings and tail formed landing gear and die-cut plywood soles. So easy a cinch to build. 20 inch span, suitable for all free gas motors.

RUNNING & TEST BLOCKS

Universal Running Block	1.50
E-Z Running Stand	1.95
Endwell Test Block	2.25

METAL GAS TANKS

1¼"x¾" or 2" Horiz.	.85
1¼"x¾" or 2" Vert.	.85
1¼"x1¼"x2" Square	.90
1¼"x1¼"x2" Half Rnd.	.90
Stunt	1.00
1¼"x1¼"x2¼" Wedge	1.00
1¼"x1¼"x2" Half Round	.95
Winston Metal	.75
Austin Tank Kit	.50
Perry Aluminum Swivel	2.00
Nelson	1.25
Minitank (smallest)	1.00
Gits Filler Tank Cap	.15

FLYWHEELS

For B & D engines	1.00
For C & D engines	1.50
Deluxe 2 1/8" dia.	2.00
1/4" shaft	1.50
5/16" or 3/8" shaft	1.75

STORAGE BATTERIES (WET CELL)

Rechargeable 2V Flight	2.75 & 2.25
4V Monitor	3.00 & 5.00

House Current Charger	4.45
Battery Charge Stand	1.95

IGNITION COILS

Aero Featherweight	2.50
Wizard	3.95
Aero Quality	3.00
Aero Dependable	1.95
Arden	2.50
Aero Contactor	2.75
Smith Big Shot	3.00
Modelectric	2.25
Aero Twin	4.00
K. Twin	5.00
Singular	1.50
Winston	2.00
Rogers	2.00
Spitfire	1.95

CONDENSERS

Regular	.20
Heavy Duty	.25
Super Heavy Duty	.35
Heavy Duty Metal	.45
Fingers	.20

SPARK & GLO PLUGS

Champion V,V2,V3,B4	
Champion V,V2,V3,VR1,VR2	.50
Sparkplug washers	.05
Glo Plugs (V2 or V3)	.85
Glo Plugs (V or V2)	.85
McCoy Hot Point	.85
Gasket set for Sparkplugs	.15

GAS MODEL BOATS

Sea Bird Hydroplane 36" B-C-D	4.95
Hardware -	2.95
Merlin P.T. 26" C-D -	7.50
Rudi Hydroplane 26" B-C-D -	15.00
Dolphin 21" A-B	6.50
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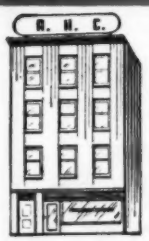

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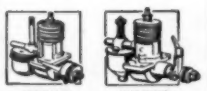

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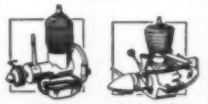

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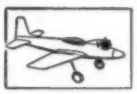

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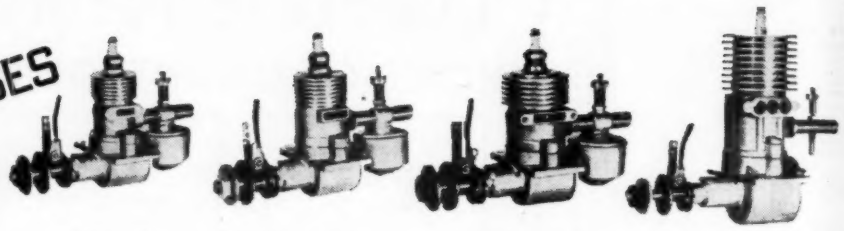

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1948 MODEL ENGINES AT LOWEST PRICES EVER!

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Do not judge the BUZZ Engines by their low prices. It is true we make very little money on each engine sold. But because many, many thousands of these engines have been produced by the latest modern processes, the cost has been reduced so that they can sell at the lowest prices ever seen.

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- Construction and materials that permit use of engines in boats and cars as well as airplanes.
- Complete instructions.
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- Easier to start.
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- Last but not least, we maintain an inspection and testing department where your engine gets the last word in care not only before it is shipped, but where it can receive expert attention if anything goes wrong after you own it.

NOW YOU CAN AFFORD THE BEST!

SPECIFICATIONS

	A	B	C	D
Displacement	.199	.299	.350	.610
Bore	.66	.812	.880	1.00
Stroke	.562	.562	.562	.777
Horsepower	1/7	1/6	1/5	1/4
RPM	7,500	8,000	8,500	9,000
Propeller	8"	10"	11"	12"
Weight (ozs.)	4	4½	4½	9

COMPLETE ACCESSORY UNIT

Sold only with each BUZZ Engine

Coil-Condenser-prop-switch high tension wire-ignition wire-coil holder-battery box-wrench-presto engine starter, No. 70 oil.

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complete with refillable tank & charging unit.

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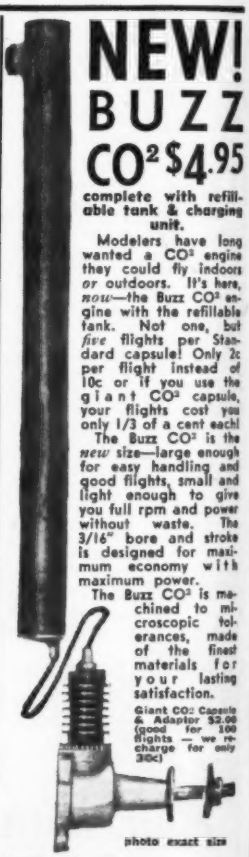

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Exceptional indoor ship held by builder Joe Bilgri. A 299.9 sq. in. model, it was unable to show its capabilities because of bad luck.

(*Continued from page 4*)

put it this way: "Should have named this the All Los Angeles Open".

Interesting bits picked up along the way: Parker Hubert Jr., a 16 year old from San Marino, Calif., won the Class D (junior) event; clocking off better than 137 mph Hubert took first place with a ship of his own design, *McCoy* powered and *Ohlsson & Rice* fueled. Parker later ran into a peck of trouble when his Class C ship, also an original design, lost the inside wing panel while doing about 140 mph. Had this ship held together, no doubt Parker would be the holder of the Class C junior speed record today.

Jimmy McElroy, up from Phoenix, Ariz., was plagued with tough luck. We watched him suffer two crackups.

The ROW events were rough on the contestants. Frank Cummings couldn't keep his fine looking job going and didn't get a flight in. Bill Butler and his son, Jack, arrived too late to qualify. Jack, however, came through with high point laurels in the Junior Sweepstakes. No mean accomplishment when you consider he got "left out" of the ROW. You should have heard the chuckles going around at the ROW. Seemed funny to see the contestants wade out in the water in their socks.

There were plenty of contestants and plenty of events at the Western Open, but it's too bad the radio control bugs got DDT sprayed on the efforts. Saw about 8 fine looking jobs waiting to show their wares. Was told later the Huntington Park club is planning a no entry fee meet in September at Western and Rosecrans for the radio controlled jobs. 12 to 15 ships have already been entered. More on this meet later.

There will be a good deal of talk about the Western Open for months to come. Maybe we have been a little too finicky in our observations; however, the modeling fraternity can't afford not to take a few friendly criticisms now and then. Many of the spectators came to the meet because they read about it in the local dailies and didn't understand the delays. They didn't understand the different events. We must cater to them if we want modeling to continue to advance, and perhaps some of the criticisms here—many of them picked up from outsiders—will help us improve on future meets.

Pete Engel didn't get to compete at the Open, but we saw his ship, a 1/8" scale job Hornet powered, come through with a win at Santa Monica the week following the Open. A much smaller meet of course, but it showed visitors what can be done to make a meet interesting. More ships like Engel's and more meets like Santa Monica will turn the trick.

Here is a complete list of 1st place winners of this All Western Model Aircraft Meet.

INDOOR EVENTS. *Rubber Powered Stick*, Jr.—Jack Butler 1:13.0; Sr.—Don Kennedy 16:13.0; Open—R. E. Schumacher 16:23.0; Expert—Bill Atwood 26:16.3. *Rubber Powered Cabin*. Jr.—Fred Andrews :15.0; Sr.—Don Roberts 2:30.0; Open—Peter G. Demos 17:28.3; Expert—Michael Demos 18:00.0. *H-L Glider*. Jr.—Ronald Truelson :33.0; Sr.—Don Kennedy :55.0; Open—Joe Bilgri 1:04.5; Expert—Peter G. Demos 1:12.0.

OUTDOOR EVENTS. *Rubber Powered Stick*. Jr.—Fred Yamamoto 6:40.0; Sr.—Charles Primbs 9:59.4; Open—Andy Tagliafico 12:19.1; Expert—Pat Regan 9:30.2. *Rubber Powered Cabin*. Jr.—Alex Campbell 2:45.8; Sr.—Charles Primbs 11:40.3; Open—Ray Accord 18:22.6; Expert—Bill Tharp 14:58.8. *Towline Glider*. Jr.—Ronald Truelson 10:00.0; Sr.—Jack Gilroy 12:00.7; Open—Yuji Hirose 8:05.3; Expert—Frank Cummings 10:40.7.

FF EVENTS. *"A" Gas*. Jr.—Ronald Truel-

(*Turn to page 54*)

Joe Mekol demonstrated there is still such a thing as an unassisted takeoff

MEGOW MODELS

READY TO FLY CO^2 Special

$1.50

A completely built model plane ready for assembly, includes all parts finished and colored, less power plant, assemble and fly it in five minutes.

Dick Korda's WAKEFIELD CHAMPION

$1.50

KIT No. Z2

SPECIFICATIONS

Wing Span - 44" Length - 36"
Chord - 5" Wing Area - 200 sq. "

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READY TO FLY 50¢

COMPLETELY FINISHED AND COLORED READY TO ASSEMBLE AND FLY

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CLASS "A" & "B"

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KIT UC-4

SPEED CONTROL LINE MODEL

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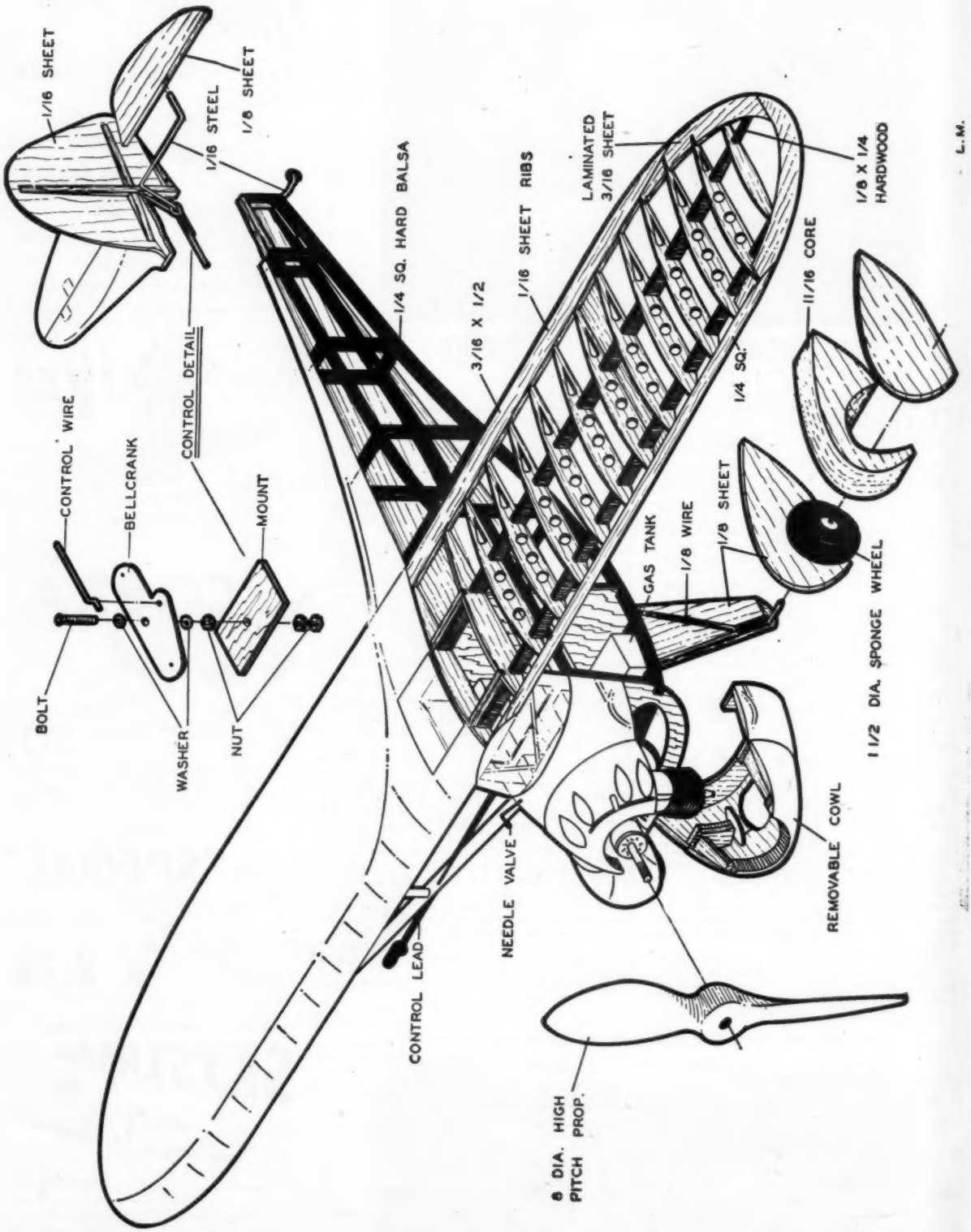


This cutaway drawing shows in detail the construction of the entire model. Note particularly how the mechanism to actuate the elevator is installed, and also the wire bracing within the landing gear housing.

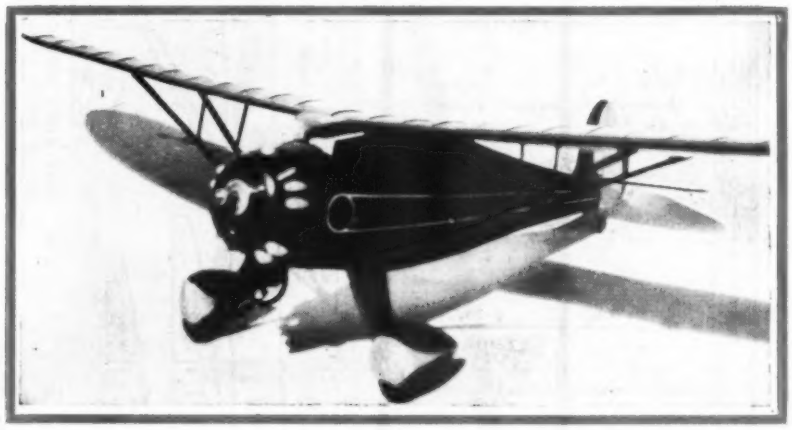
by LEN MARLOW

Model Monocoupe

ONE of the most attractive sport planes ever built, and one of the fastest for its horsepower, is the *Monocoupe 90-A*. Powered with a Lambert 90 hp engine, the *Monocoupe* has a maximum speed of 130 and a cruising speed of 110. It was popular in a clipped-wing racing version, which may be incorporated in the model by removing 2 inches from each wing.

In virtually all respects the model outlined here is an accurate one inch to the foot scale copy of the actual plane, the most notable deviation from this scale being a slight lengthening of the landing gear and raising of the thrust line to provide ample clearance for the prop. The landing gear has also been moved farther forward, placing it ahead of the C.G.

In addition to being a good performer, the model is also outstanding in appearance—a fact for which we claim no credit, leaving that honor to the designers of the real thing. The color scheme of the model is orange and cream, set off by black pin stripes, separation lines and numerals. The builder may of course follow his own preference in decorating the model, but we decided that a fairly close adherence to the actual scheme used on the full scale plane produced a more realistic copy.



To begin construction, lay out two side frames of 1/4" sq. hard balsa directly over the side plan view (heavy black lines). To form the curve of the lower longeron it will probably be found best to soak the balsa in water. Pin the longeron in place and allow it to dry thoroughly before cementing the uprights. When the two side frames are completed, cement them to the 1/16" plywood F3 and F4 formers. Add the 1/4" sq. crossbraces, 1/4" x 3/8" hardwood landing gear mounts, 3/8" x 1/2" motor mounts, and the 1/16" plywood bellcrank mount. As the longerons must be cut or cracked directly behind the cabin, they are reinforced with 1/4" sheet gussets and plenty of cement. The landing gear is formed from 1/8" steel wire, wrapped and soldered, and attached to the mounts. On the landing gear especially, go over all joints several times with cement.

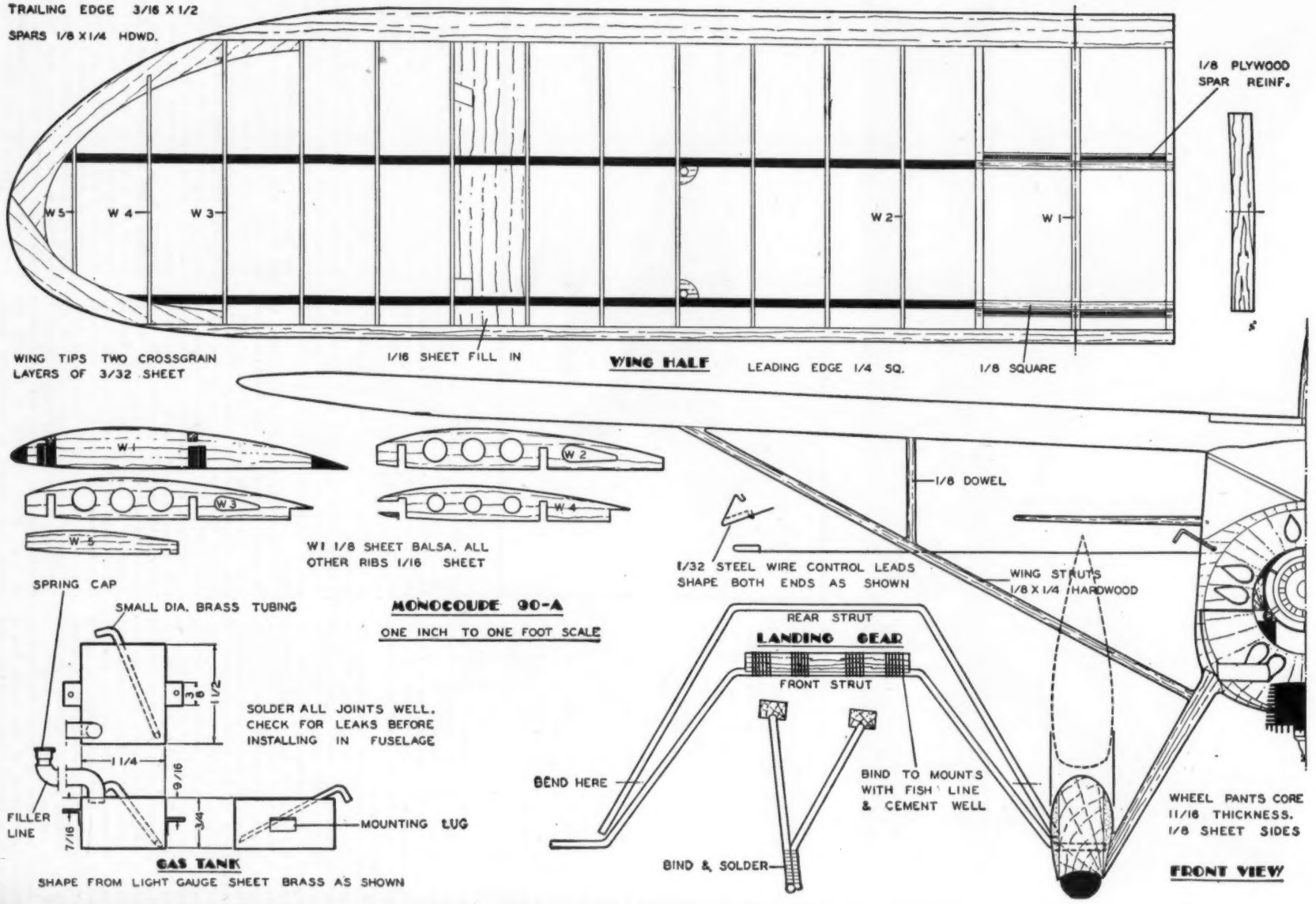
It will be easier to install the controls and ignition system at this point. Use a good grade of heavily lacquered wire and solder all joints carefully. Be sure the coil and battery box are mounted solidly. No provision was made on the original for any access except to the motor and batteries; however, a hatch may be easily constructed in the side or bottom of the fuselage in order to reach the bellcrank and coil. The battery hatch, as indicated on the plans, is made of 1/8" sheet, hinged with crenoline, and secured with a large dress snap or other suitable means.

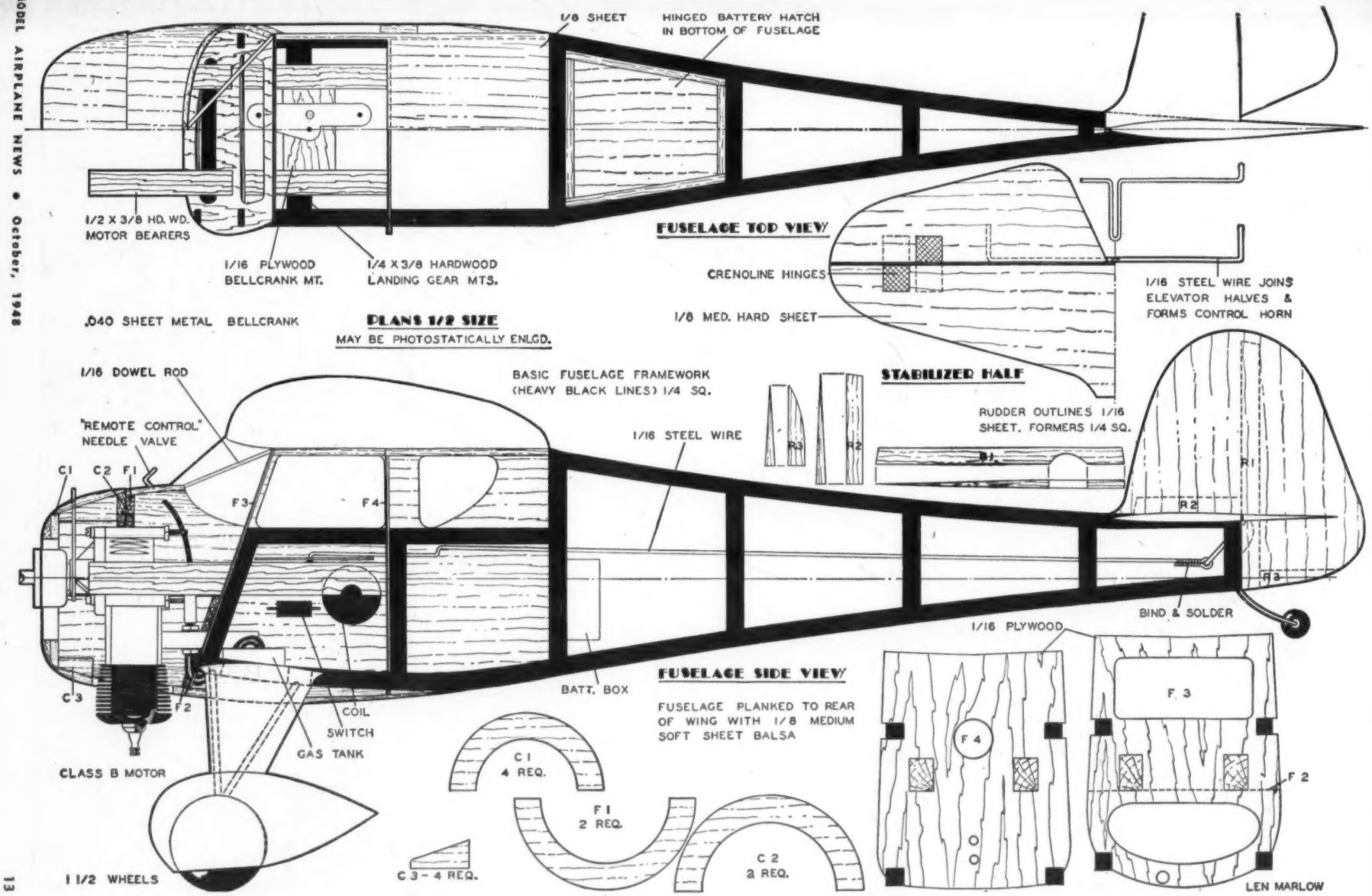
The upper half of F1 is cemented to the motor mounts; F2 and the lower half of F1 are lightly held in place by using pins or small dabs of cement. Plank the fuselage back to the rear of the wing with 1/8" sheet. The front cowling ring is composed of two crossgrain rings of 1/8" sheet, and is cemented together with formers C2 and C3, planked with 1/8" sheet and sanded to shape. After being cemented to the nose, the lower half of the cowling and that portion of the fuselage between F1 and F2 are separated from the rest of the plane as a unit, forming a removable cowl which is cut out to accommodate the engine installed. Landing gear is covered with two pieces of 1/8" sheet, recessed to fit over the struts, and sanded to streamline shape. Pants are built up and sanded to shape from an 11/16" core and 1/8" sheet sides. A mixture of balsa dust, clear dope and cement is used for fillets. Before going any further, spray or brush a heavy coat of shellac over the inside of the cowling and the fuselage back to F4.

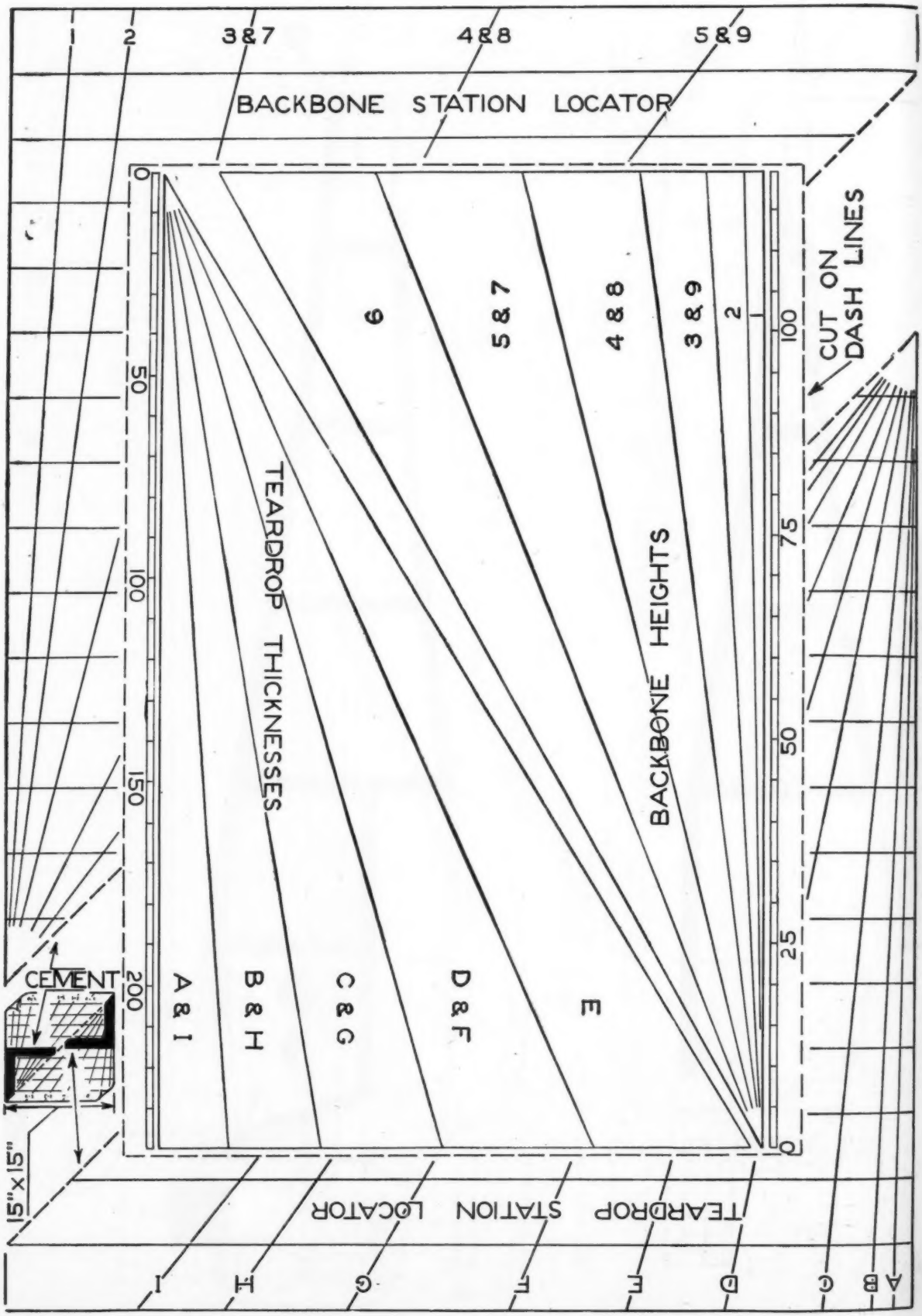
An *Ohlsson 23* mounting is shown on the plans, along with the modified needle valve and gas tank it requires. The filler line for the tank may be extended through the fuselage as desired and a small hole cut in the side of the fuselage for choking the motor. The installation of a motor equipped with a rotary valve is simpler, but in all cases remember to keep the neoprene tubing used as a gas line as short as possible and free of kinks.

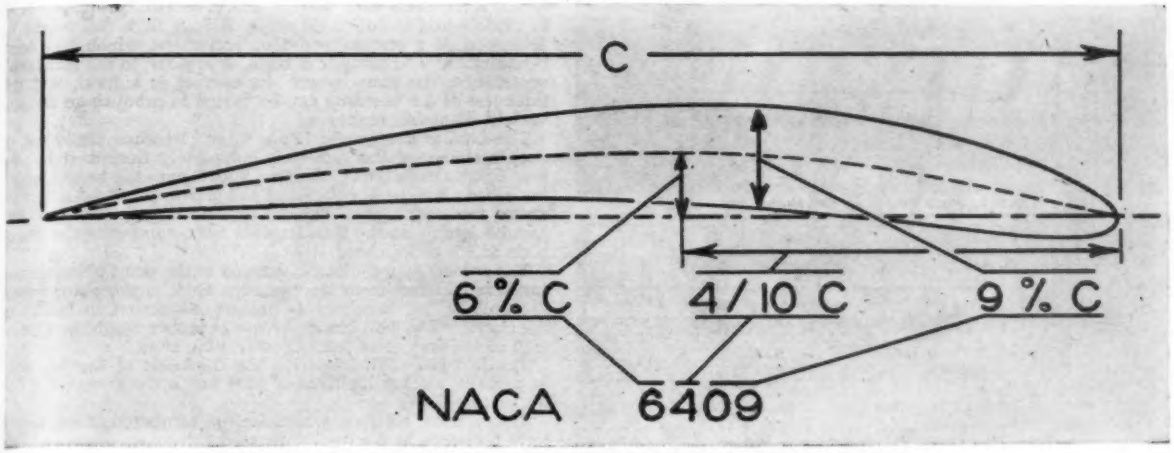
Rudder construction is similar to that used in many controline jobs with balsa covered wings, consisting of two 1/16" outline sheets and inner formers. A portion of R1 is cut out, as are the two rear fuselage uprights, to allow movement of the control horn. Stabilizer and elevators are cut to outline shape from 1/8" sheet balsa and sanded to an airfoil section. The combination control horn and elevator connecting piece is formed from 1/16" steel wire as outlined on plans, and the

(*Turn to page* 50)


TRAILING EDGE 3/16 X 1/2
SPARS 1/8 X 1/4 HDWD.
1/8 PLYWOOD SPAR REINF.
W 5
W 4
W 3
W 2
W 1
WING TIPS TWO CROSSGRAIN LAYERS OF 3/32 SHEET
1/16 SHEET FILL IN
WING HALF
LEADING EDGE 1/4 SQ.
1/8 SQUARE
W 1
W 2
W 3
W 4
W 5
W1 1/8 SHEET BALSA. ALL OTHER RIBS 1/16 SHEET
1/8 DOWEL
1/32 STEEL WIRE CONTROL LEADS SHAPE BOTH ENDS AS SHOWN
WING STRUTS 1/8 X 1/4 HARDWOOD
SPRING CAP
SMALL DIA. BRASS TUBING
MONOCOUPE 90-A
ONE INCH TO ONE FOOT SCALE
REAR STRUT
LANDING GEAR
FRONT STRUT
SOLDER ALL JOINTS WELL. CHECK FOR LEAKS BEFORE INSTALLING IN FUSELAGE
1 1/2
3/8
1 1/4
9/16
3/4
7/16
FILLER LINE
MOUNTING LUG
GAS TANK
SHAPE FROM LIGHT GAUGE SHEET BRASS AS SHOWN
BEND HERE
BIND TO MOUNTS WITH FISH LINE & CEMENT WELL
BIND & SOLDER
WHEEL PANTS CORE 11/16 THICKNESS. 1/8 SHEET SIDES
FRONT VIEW


1/8 SHEET
HINGED BATTERY HATCH IN BOTTOM OF FUSELAGE
1/2 X 3/8 HD. WD. MOTOR BEARERS
1/16 PLYWOOD BELLCRANK MT.
1/4 X 3/8 HARDWOOD LANDING GEAR MTS.
.040 SHEET METAL BELLCRANK
PLANS 1/2 SIZE
MAY BE PHOTOSTATICALLY ENLGD.
FUSELAGE TOP VIEW
CRENOLINE HINGES
1/8 MED. HARD SHEET
1/16 STEEL WIRE JOINS ELEVATOR HALVES & FORMS CONTROL HORN
1/16 DOWEL ROD
"REMOTE CONTROL" NEEDLE VALVE
BASIC FUSELAGE FRAMEWORK (HEAVY BLACK LINES) 1/4 SQ.
1/16 STEEL WIRE
STABILIZER HALF
RUDDER OUTLINES 1/16 SHEET, FORMERS 1/4 SQ.
C1 C2 F1
F3
F4
R1
R2
R3
C3
F2
COIL
SWITCH
GAS TANK
BATT. BOX
BIND & SOLDER
CLASS B MOTOR
FUSELAGE SIDE VIEW
FUSELAGE PLANKED TO REAR OF WING WITH 1/8 MEDIUM SOFT SHEET BALSA
1/16 PLYWOOD
C 1 4 REQ.
F 1 2 REQ.
C 2 2 REQ.
C 3 - 4 REQ.
F 4
F 3
F 2
1 1/2 WHEELS
LEN MARLOW

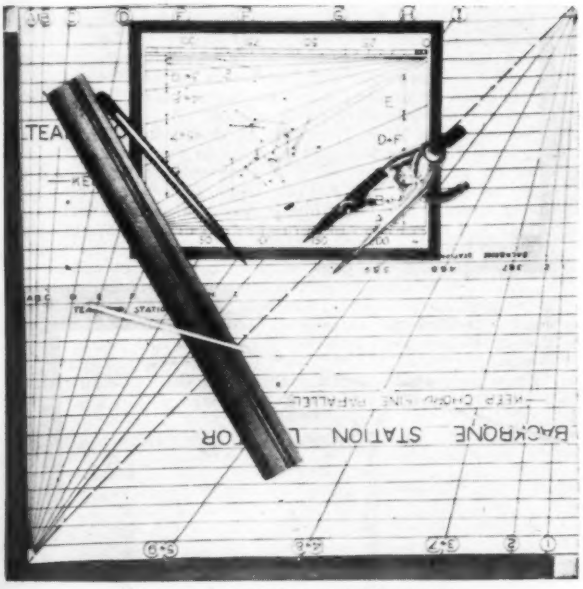

BACKBONE STATION LOCATOR
1
2
3&7
4&8
5&9
CUT ON DASH LINES
BACKBONE HEIGHTS
6
5&7
4&8
3&9
2
1
0
50
100
150
200
100
75
50
25
0
TEARDROP THICKNESSES
A&I
B&H
C&G
D&F
E
CEMENT
15"x15"
TEARDROP STATION LOCATOR
I
H
G
F
E
D
C
BB
A



Here we see the variable dimensions of the Four Digit Family—all are related to the chord

Four Digit Family

by PAUL McILRATH



Above are the materials needed for layout of wing sections; below is the end result

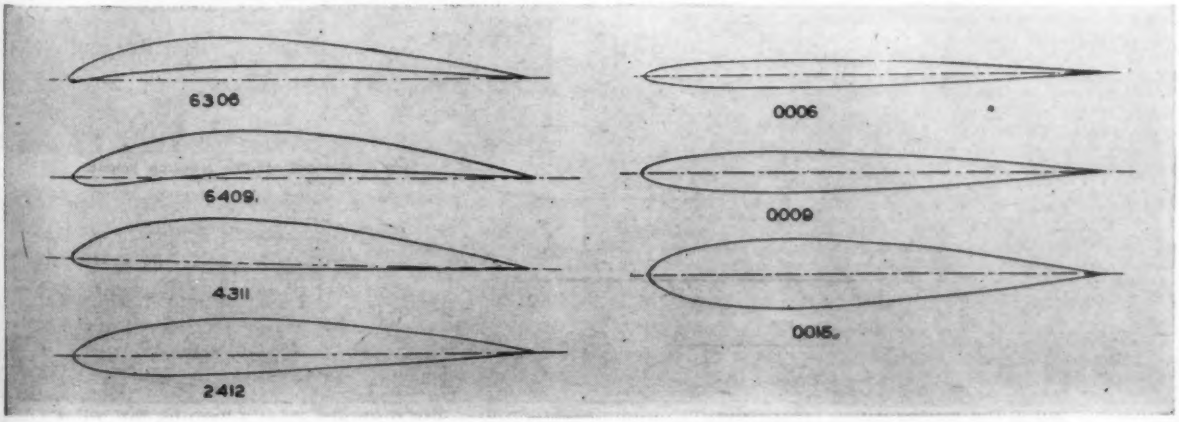
WHEN an aeronautic engineer plots an airfoil he uses the appropriate table of ordinates, slide rule, French curves, proportional dividers and other assorted drawing instruments. When a modeler draws an airfoil he uses pencil and imagination.

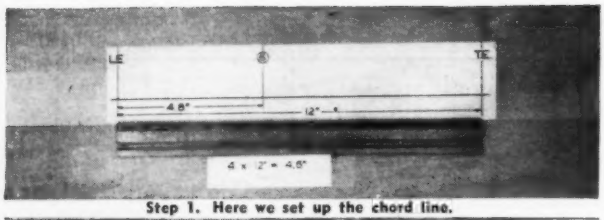
Unless we are lucky enough to find the desired wing section drawn just the right size in a model magazine, we average fellows are forced to rely on the Zip-Zip (two lightning stroks of the pencil) section. The reasons are obvious: no table of ordinates, no slide rule, no drawing instruments.

While the old Zip-Zip can't be beat for speedy production, it leaves a lot to be desired. Suppose that this original airfoil gave fine performance except that it was a little too fast. Could the lift be increased on the next model without completely changing the other characteristics? Or even if the section were perfect, could you draw another one just like it for a ship in a different class, or describe it accurately enough so that other designers could draw one?

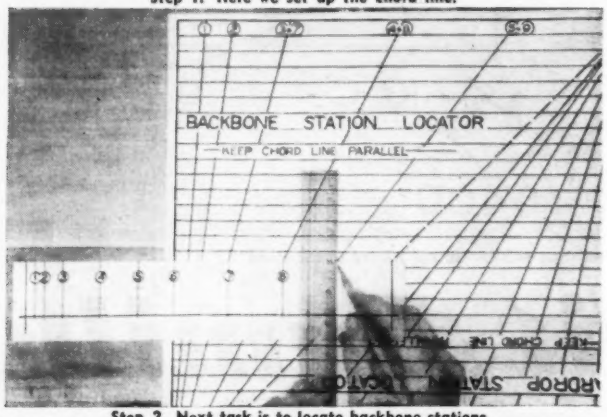
These obvious faults of the cut-and-try method can be avoided by use of airfoils whose lines are precisely described by mathematical formulas. Two curves defined by the same equation are identical, no matter where or when or by whom they are drawn. And it is possible—merely by substituting a 6 for a 5 somewhere in the formula—to get more lift or to change the performance in any manner desired.

The National Advisory Committee on Aeronautics has developed such a group of airfoils—the Four Digit Family—

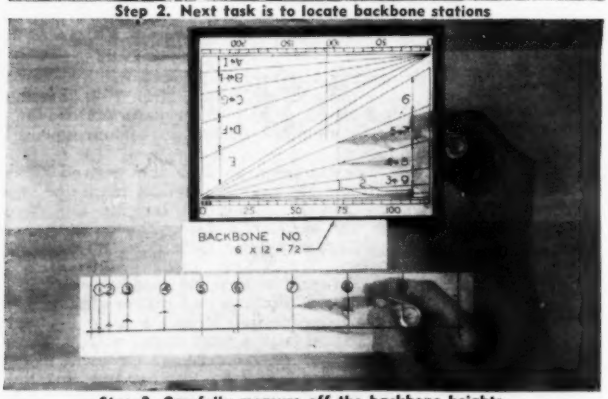




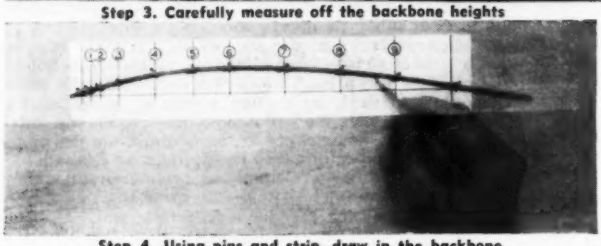
Step 1. Here we set up the chord line.



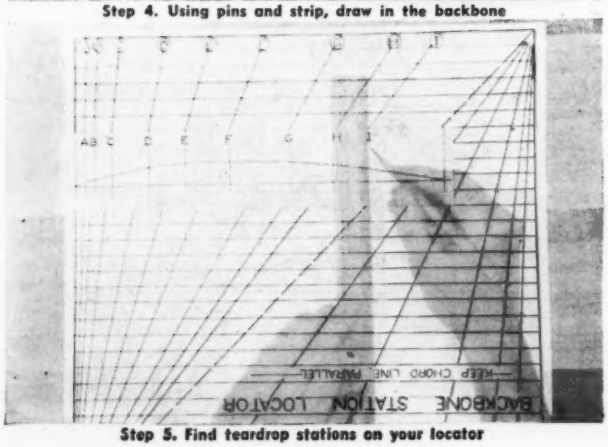
Step 2. Next task is to locate backbone stations



Step 3. Carefully measure off the backbone heights



Step 4. Using pins and strip, draw in the backbone



Step 5. Find teardrop stations on your locator

which have been very widely and successfully applied both to models and to full scale ships. A four digit foil might be described as a streamlined teardrop shape which has been bent slightly. The amount of bend, or *camber*, in the teardrop's center line, the place where the camber is highest, and the thickness of the teardrop can be varied to produce an endless variety of airfoil shapes.

The family was named "Four Digit" because the shape of each member of the family is completely described by the four figures in its name. The first figure gives the height which the center line, or *backbone*, of the teardrop has been arched above the chord line. This is expressed in percent of the airfoil's length, so the familiar 6409 has a camber in the backbone of 6% of its chord.

The second figure tells the location of the point of maximum camber: distance from leading edge back to the place where the arch of the backbone is highest, expressed in tenths of the chord. The 6409 has its greatest camber height at a point 4/10 of the way from leading to trailing edge.

The last two digits describe the thickness of the teardrop in percent of chord. Thus, a 6409 has a thickness of 09 or 9% of the chord.

Symmetrical sections, which are not cambered at all, would have no curve in the backbone, so the first two digits in their names are zeros.

The exact performance characteristics of each different airfoil cannot be included in this article because it would require too much space. And though a vast amount of performance data is available, most of it is not applicable to low speed flight.

The general qualities are known to all modelers. Thick and highly cambered sections tend to produce high lift and high drag; thin and slightly cambered sections give lowest drag and correspondingly low lift.

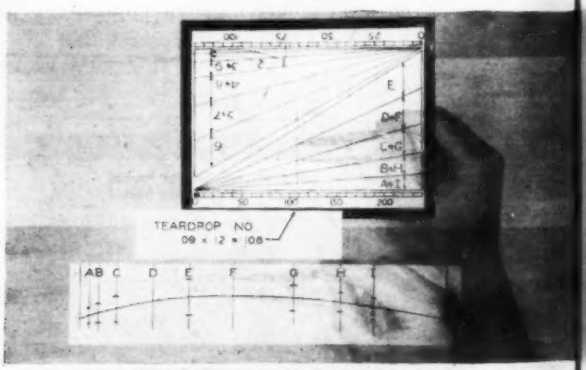
Perhaps you have followed us this far but hesitate to try the actual plotting of an airfoil because the job looks complicated. The template system was devised especially for the fellows, including your truly, who have neither the equipment nor patience to do the job the old way—it only looks complicated to those who have never tried it.

No formulas, tables of ordinates, or special equipment are required. All the math can be done in your head. The only drawing instrument used is a dime store compass. *All* the wide selection of NACA Four Digit Airfoils can be reproduced, quickly and faithfully, in any size up to 15 inches.

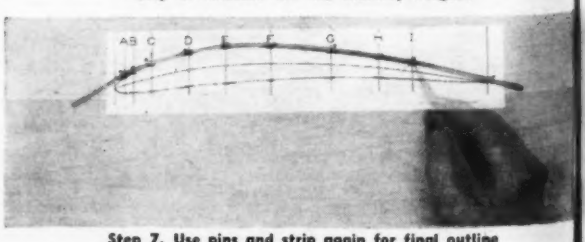
Two full size templates are used (see page 15), but since it would be difficult to present a pattern for a 15 inch foil on this 10 inch magazine page, one of the templates will have to be stretched a little. To do this: first cut along the dash lines to remove the rectangular template marked "Teardrop Thicknesses" and "Backbone Heights" from the center of the page. Cement it to a piece of heavy paper. It is full size and ready to use.

Trim the two L-shaped pieces from the remainder of the

(*Turn to page* 46)



Step 6. Measure off the teardrop heights



Step 7. Use pins and strip again for final outline

design forum

by CHARLES H. GRANT

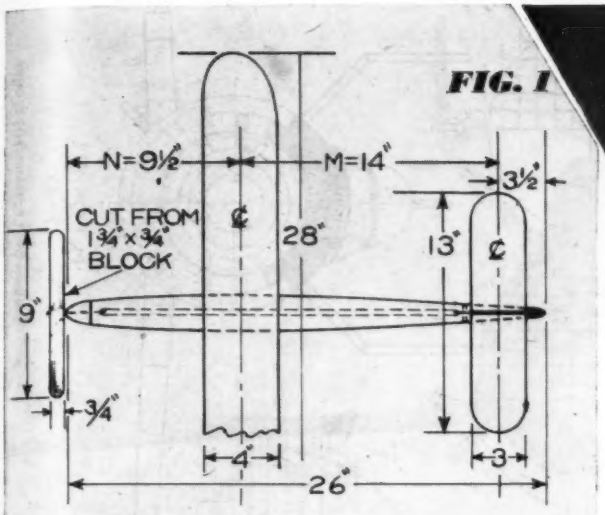


FIG. 1

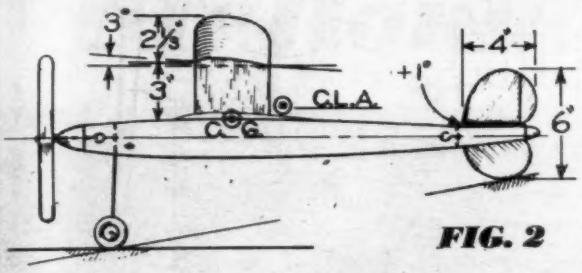


FIG. 2

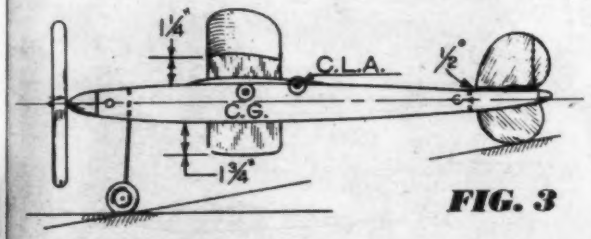


FIG. 3

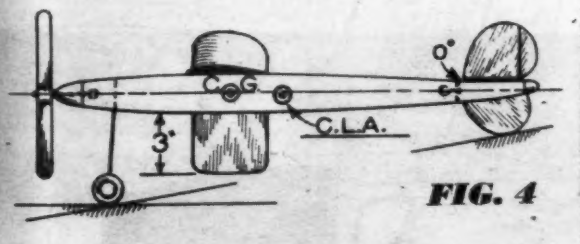


FIG. 4

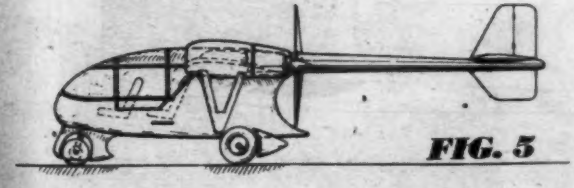


FIG. 5

THERE have been some heated discussions concerning what is known as the center of lateral area (CLA) effect. This was formulated into a theory and applied to model planes in 1933 and was the result of *actual practical experience*. It was not prompted by some intangible theory or imaginary conception. This effect was noted by the author as far back as 1921, but all the facts were not correlated into a definite theory at the time.

It was the reoccurrence on many occasions of unstable characteristics in *heavy fast* airplanes that prompted investigation of their origin. Every means of stabilizing these planes was tried during hundreds of tests, but complete stability was obtained only when the CLA was located in certain positions relative to other factors of the airplane such as the center of gravity (CG), position of fin, angle of incidence, etc. When its significance was suspected, it was not immediately assumed that this was a cureall or that the complete answer had been found. Thousands of additional tests with hundreds of models were carried on and their results carefully noted. What is known as the CLA theory developed from the facts indicated by these tests.

Since this theory was first discussed, many model builders and engineers have condemned it. But the facts indicate that it has been used in a pre-determined manner by hundreds of aeronautical men with complete success. Its background in experiment and analysis is too well founded now for anyone to say that there is nothing in it. Its conception may be modified or refined, but to say the principle does not exist is to ignore the performance of hundreds of model planes as well as full scale aircraft. In fact, nearly every full scale plane today embodies a stable location of the CLA.

Very often the theory is condemned by those who do not understand it or *misapply it;* they calculate CLA position inaccurately, or bring in some other factors that modify its quantative effect. Raoul Hoffman, one of our readers who has been a prominent full scale designer, condemns the CLA. We quote from his letter:

"In the April issue Mr. Grant mentions 'Since that time many modelers, including the experts, have been trying to disprove it'. He means the CLA which he claims he originated in 1933. As I recall, it was formulated by the French in 1925 and I tried it in 1927 on an airplane I designed when chief engineer to Laird Airplane Co. But it did not work.

"Having been active in model, airplane, helicopter and jet designs since 1901 I do hope you will drop the use of the CLA in your very interesting M.A.N.

"I am surely sorry that model engineering is 35 years behind the airplane designs, and only a few model engineers do any research in models or develop theories that will give the exact flight characteristics of a model by mathematics."

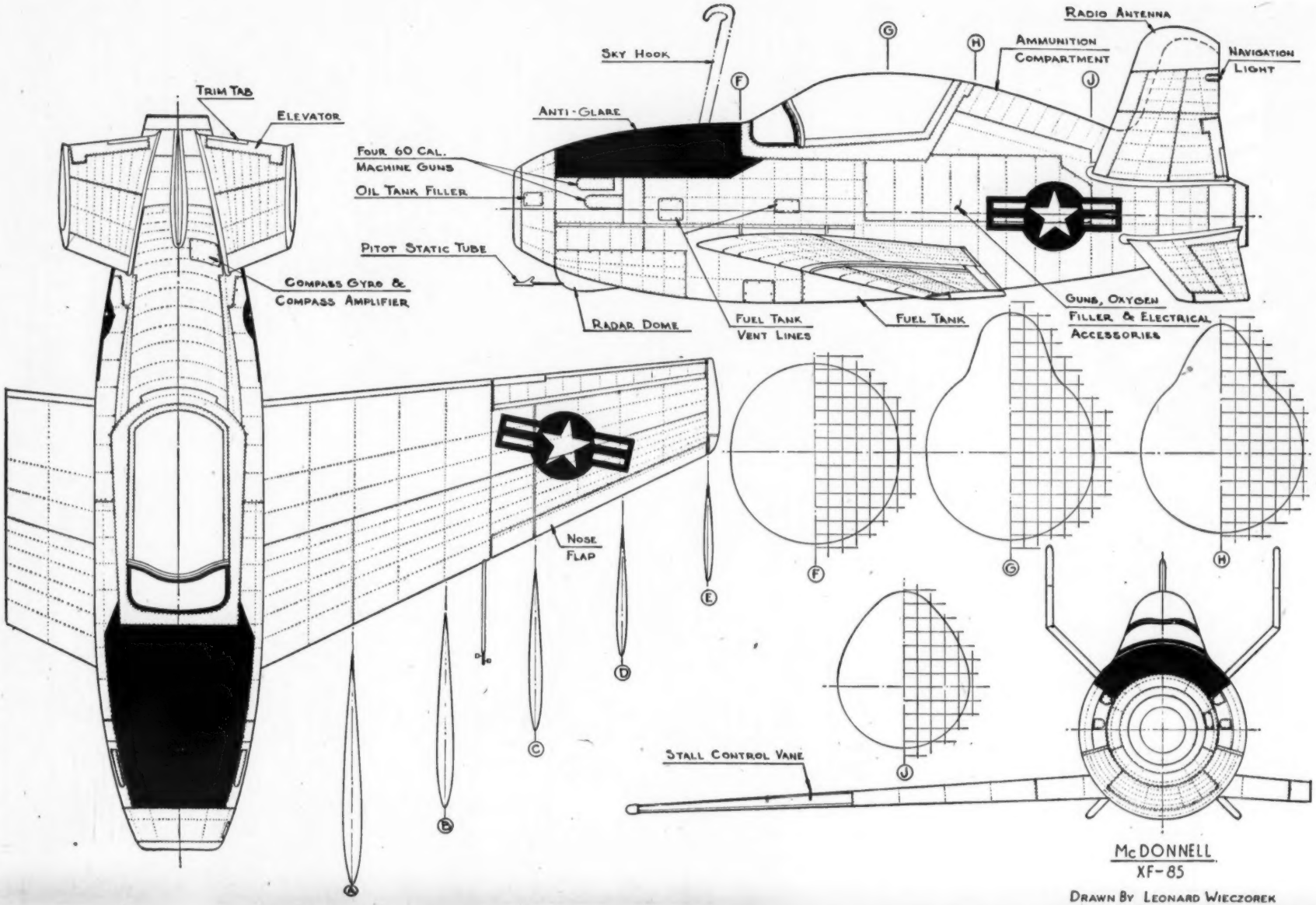
We thank Mr. Hoffman for giving us his comments because we believe that condemnations bring the issue into the open where the truth may be discussed and ascertained. In this case we do not agree that the use of the CLA should be discontinued. Time and the light of truth disclosed through public discussion will measure its accuracy and value. If there is nothing to it, it will die. If it has some value, people will continue to use it and benefit from it.

Also, Mr. Hoffman, this writer never stated or intended to suggest that the CLA was "originated" by him.

There is also a question whether or not the theory applied by Mr. Hoffman and the one referred to here are identical or even similar, because he has neglected to clearly state his case in detail. If he will do so we shall be glad to publish them.

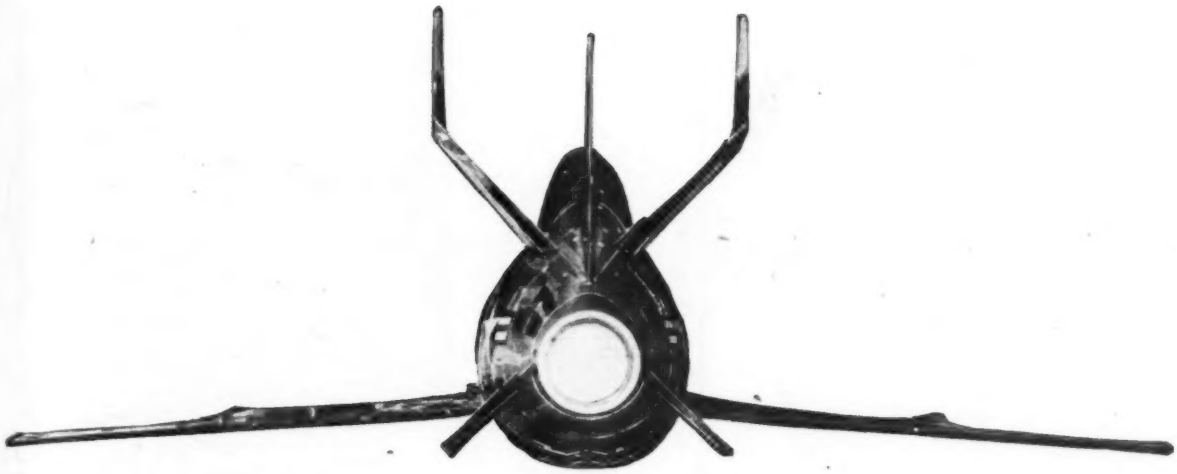
He says that he tried the CLA theory *once* in 1927. One attempt can hardly be conclusive when the theory itself, as it stands at present, is the result of over 2000 tests. It is

(*Turn to page* 37)



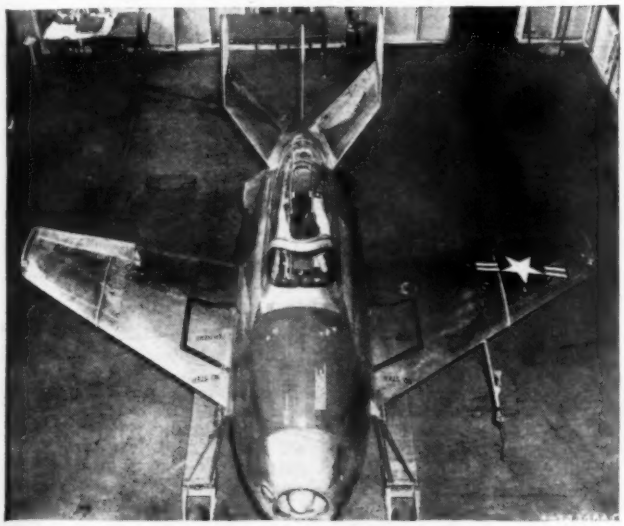
McDONNELL
XF-85

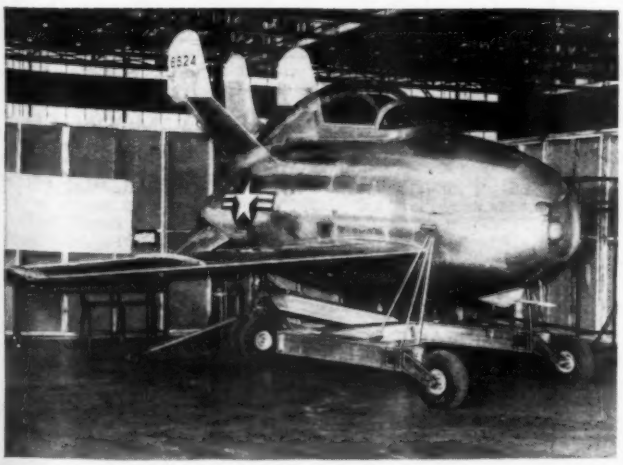
DRAWN BY LEONARD WIECZOREK



DRAWN BY LEONARD WIECZOREK

McDonnell XF-85





by ROBERT McLARREN

A CONVAIR B-36A, world's largest bomber, is cruising at more than 30,000 ft. over Asia. Its spacious bomb bays house tons of heavy demolition bombs. It has flown almost 5000 miles, yet its journey is only half over. As we on the ground watch, we suddenly see the silvery glint of Mikoyan jet fighters streaking skywards toward the B-36. Assuredly, the comparatively slow bomber is caught in a spider web—cornered in the spaceless sky to be hammered to bits by the jet fighters. But, then, a 20th century miracle seems to happen as the B-36 opens its forward bomb bay.

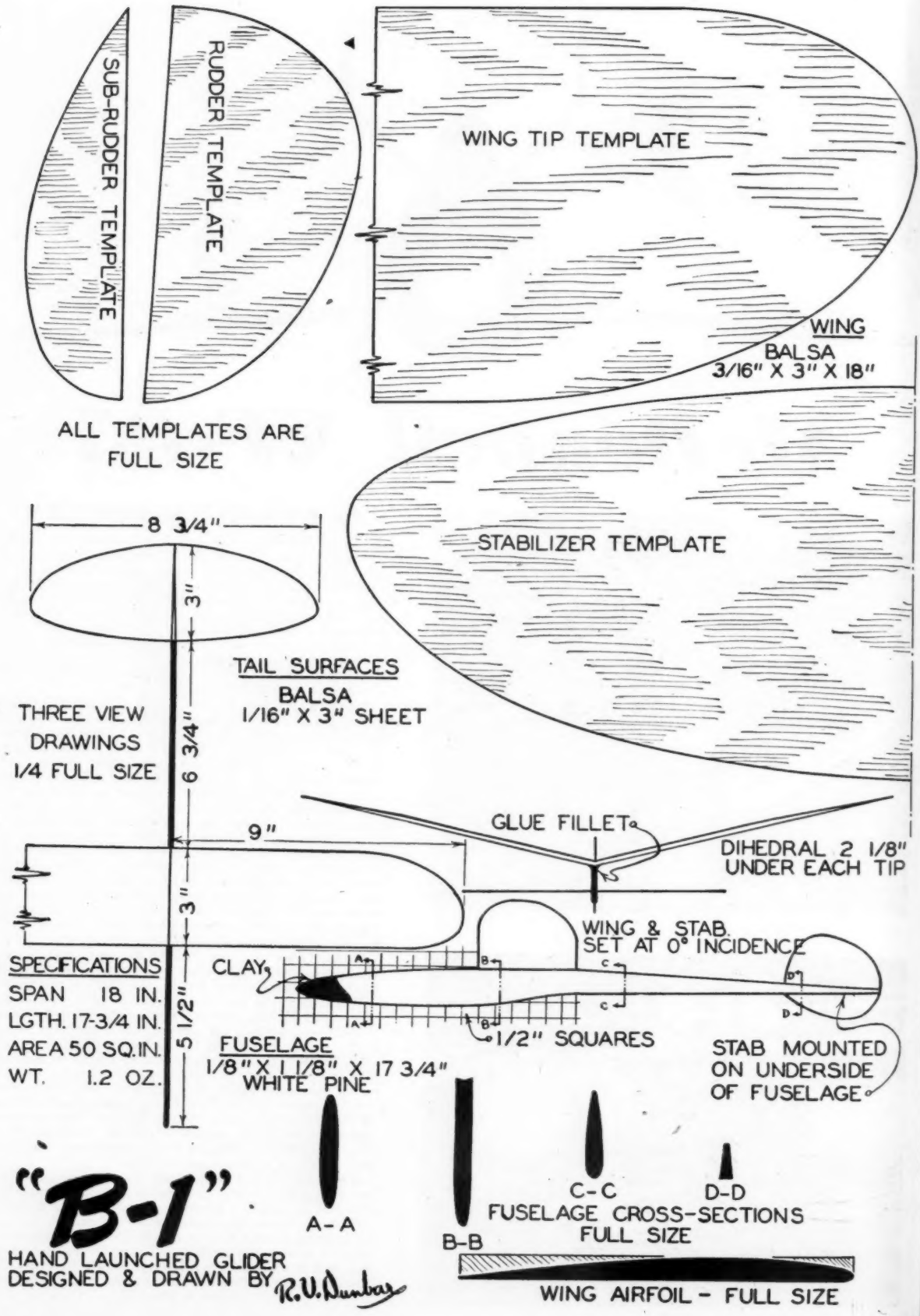
Dropping his bombs! Perhaps he's found the target—perhaps he's only lightening ship. But wait . . . suddenly a trapeze folds downward out of the No. 1 bomb bay and we see a tiny, barrel-shaped object hanging on the trapeze: perhaps the atom bomb! But no—the object slowly folds out its wings like a butterfly and as quickly darts out ahead of the bomber, turns quickly and drops like a streak on the upcoming enemy fighters. A long blast of .50 cal. machine gun fire, and in only an instant one of the Mikoyan fighters is ablaze and the tiny fighter is turning for another pass. In a question of seconds all three of the jet fighters are blazing earthward and the tiny craft is climbing back to its "mother" ship. Slowly it aprpoaches from below and behind, and as we watch it suddenly swoops up and is caught on the trapeze. Slowly the trapeze with its tiny fighter is drawn up into the belly and the huge bomb bay doors roll shut.

Fiction? Not on your life! In the next few months that picture will be a reality. For that tiny parasite fighter is the McDonnell XF-85, our Plane of the Month.

The idea of the parasite fighter is not new, and our older readers will well recall the squadron of Curtiss F9C-2 *Sparrowhawk* fighters carried in the belly hangar of the *U.S.S. Akron* and *U.S.S. Macon* dirigibles in the early 'thirties. Literally thousands of successful launchings and retrievings of these tiny craft were carried out by the two huge lighter-than-air craft before they were lost, the *Akron* off the New Jersey coast and the *Macon* off the California coast, both in storms. That squadron was commanded by (then) Lt. H. B. "Min" Miller, a long time MODEL AIRPLANE NEWS contributor, and later Rear Admiral Miller, now retired.

It was logical, based upon this experience, that many of our readers should propose this same arrangement but with a bomber's bomb bay replacing the dirigible, and many such suggestions were submitted through the ensuing years. Here is one of the rare occasions in which a *Design Forum* idea has actually come to fruition, and it affords us a rare opportunity to study that mysterious gap between a reader's idea and the finished

(*Turn to page* 55)


SUB-RUDDER TEMPLATE
RUDDER TEMPLATE
WING TIP TEMPLATE
WING
BALSA
3/16" X 3" X 18"
ALL TEMPLATES ARE
FULL SIZE
STABILIZER TEMPLATE
8 3/4"
3"
6 3/4"
TAIL SURFACES
BALSA
1/16" X 3" SHEET
THREE VIEW
DRAWINGS
1/4 FULL SIZE
9"
3"
5 1/2"
GLUE FILLET
DIHEDRAL 2 1/8"
UNDER EACH TIP
WING & STAB
SET AT 0° INCIDENCE
SPECIFICATIONS
SPAN 18 IN.
LGTH. 17-3/4 IN.
AREA 50 SQ.IN.
WT. 1.2 OZ.
CLAY
1/2" SQUARES
FUSELAGE
1/8" X 1 1/8" X 17 3/4"
WHITE PINE
STAB MOUNTED
ON UNDERSIDE
OF FUSELAGE
"B-1"
HAND LAUNCHED GLIDER
DESIGNED & DRAWN BY R.V. Dunbar
A-A
B-B
C-C
D-D
FUSELAGE CROSS-SECTIONS
FULL SIZE
WING AIRFOIL - FULL SIZE

B-1 glider

by R. V. DUNBAR

Hand-launched gliders are trickier than their simple appearance suggests—try this one

OUTDOOR hand launched gliders are frequently built too light in weight. This type of model should have the weight and the momentum necessary to carry it as high as possible when it is thrown, yet it should be light enough to glide flatly and to soar on weak ground thermals. The ideal wing loading seems to be slightly over 2 oz. for every 100 sq. in. of wing area. *B-1* is in this weight category.

B-1 is fast, but its glide is flat, and its stable force arrangement permits a fairly tight circle in the glide without excessive spiral tendencies. The original model performed consistently and well in all kinds of weather.

Select your materials carefully. The wing and tail surfaces should be medium soft, quarter-grained balsa wood. A quarter-grained cut may usually be recognized by its irregular grain, and by its resistance to bending. The fuselage should be clear, straight-grained white pine.

Make the wing in one piece. Balsa varies greatly in density, and if a separate piece is used for each wing half you may have difficulty making both panels weigh the same. Work the approximate airfoil shape into the wing stock with a plane or spoke-shave. A knife may be used *if you are careful*. Finish the airfoil by sandpapering. Do not use coarse sandpaper which will scratch the surface, as these scratches increase the drag of the wing in flight. Use the wingtip template in the plans and shape the tips. Cut the wing in half and bevel the edges of the cut to allow for the 2-1/8" dihedral under each tip. Cement the joint securely. To prevent failure of this joint when the glider is thrown, a "skin" of cement is extended about 1" out on each wing panel. Apply 3 or 4 light coats of cement in preference to one heavy layer.

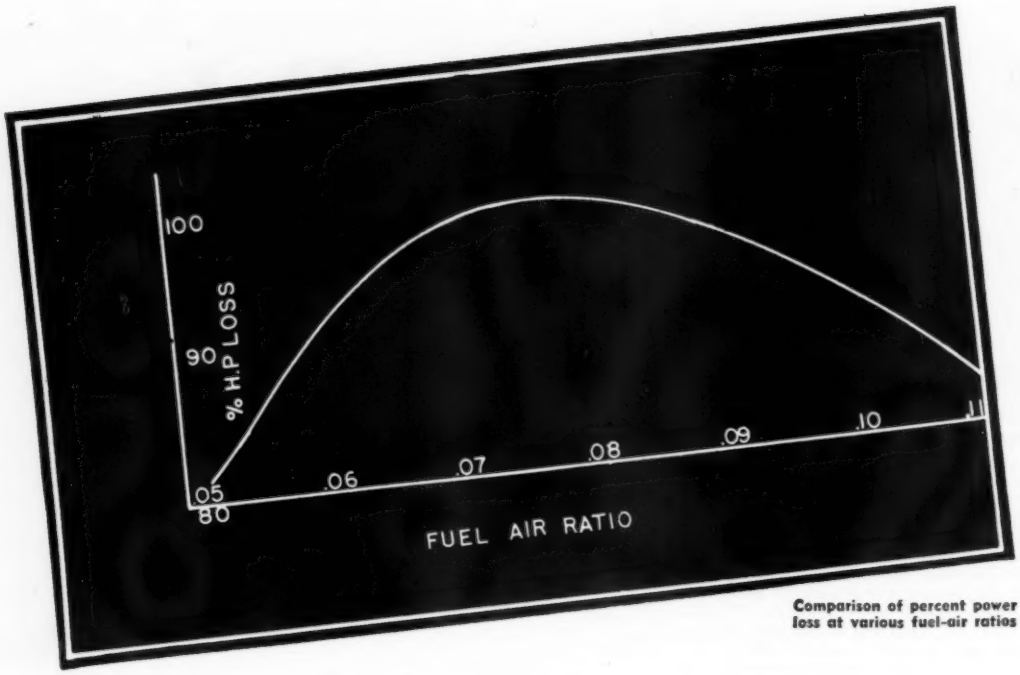
Cut the rudder, sub-rudder and stabilizer to shape, using templates in the plans. Sand them to a streamlined cross-section with 2-0 sandpaper, and finish with 5-0 or 6-0.

The fuselage outline should be enlarged and transferred to a piece of 1/8" pine. Cut it to shape with a scroll saw. If you have access to a jig saw, so much the better. Shape it according to the crossections shown in plans, noting that the portion upon which the wing is mounted is grooved slightly, and that the stabilizer mounting surface is flat.

Assemble the glider, applying cement "skins" to all joints. Spread a ribbon of cement along the bottom of the sub-rudder to prevent splintering of that portion which strikes the ground during a landing. Use sanding sealer to fill the wood pores, and sandpaper it lightly when dry. Apply several coats of dope or glider polish to the entire model. Sand lightly between each application with 6-0 or finer sandpaper. When the finish is smooth enough the glider is ready to fly.

Try a few gentle glides in tall grass. Add modeling clay to the nose until your model floats as flatly as possible without stalling. To adjust *B-1* correctly, a right-handed person should warp the trailing edge of the rudder slightly to produce a left circle in the glide, and warp the trailing edge of the outboard wing down slightly to produce a left banking attitude (adjust for a right turn and right bank if you are left-handed).

In launching, the glider is banked a little to the right, and the nose is pointed up a few degrees. Throw it as hard as you can. When correctly adjusted it will climb in a vertical arc, finishing its climb upsidedown, then flipping over into its glide. Another hint: if you are not too brawny and cannot toss your glider high enough for a proper recovery at the peak of its climb, cut a small notch in the wing trailing edge next to the fuselage in which to place your first finger when throwing the glider. You will have a surer grip on your glider, and your launch will have more power and better control.



Comparison of percent power loss at various fuel-air ratios

Facts On Fuel

Model engine fuel is a lot more than just "gas 'n oil"—learn about it here

by WILLIS L. NYE

GENERAL—The speed and performance of a model airplane when powered with an internal combustion engine are functions of aerodynamic design and the engine-propeller configuration. The engine-propeller performance in turn is a function of the power developed and the kind of fuel burned. Gasoline, a petroleum derivative, is the best fuel to burn in internal combustion engines, regardless, and with the addition of other anti-knock fuel components it is possible to improve certain phases of the fuel performance. Why is gasoline the best fuel? Because pound for pound it develops more heat units when burned efficiently than any other fuel suitable for internal combustion engine operation.

DESIRABLE QUALITIES OF ENGINE FUELS—What may be considered to be the desirable qualities which distinguish a good engine fuel from one of inferior quality? Briefly these may be summarized as follows:

(1) It should enable the engine to be easily started when cold.

(2) It should not emit an unpleasant odor before or after combustion.

(3) The specific gravity and the calorific value should be within the limits stated by the manufacturer.

(4) It should not leave a corrosive residue within the combustion chamber of the cylinder.

(5) It should be capable of nearly perfect atomization.

(6) It should perform efficiently over a wide range of atmospheric humidity and temperature.

CLASSIFICATION OF ENGINE FUELS—Internal combustion engine fuels may be divided into five basic groups: (1) Gasoline. (2) Alcohol. (3) Methanol. (4) Ether for compression ignition engines. (5) Ether for glow plug engines.

Note that gasoline is the only petroleum derivative of the five basic groups. Straight run gasoline is that fuel which is derived from crude petroleum by simple distillation and contains a large proportion of normal hydrocarbons of the paraffin series. Usually, the octane number is too low for use in spark ignition engines and it is blended with other products to improve the combustibility. Normally, straight run gasoline mixed with the necessary lubricant is used in low compression two-cycle engines. This kind of fuel is known as hot fuel and may be purchased from your hobby dealer.

Alcohol, a derivative of the dry distillation of organic materials, is highly volatile and inflammable. Alcohol may be chemically acclimatized. This acclimatization is achieved by blending various fuel components together with due consideration given for the reciprocating specifications of the engine. Alcohol as a fuel is less subject to knocking because of its higher resistance to pre-ignition in a spark ignition engine. When you purchase alcohol fuel from your hobby dealer specify what kind of operation is anticipated. For example, alcohol fuel for use in humid moist air contains chemical components which are entirely different from fuel intended to operate at sea level, moderate density dry air, or for operation at high elevation. In the engine compression range from 7.5 to 18 to 1, alcohol fuels are suitable for use. Alcohol fuels are known as cool or cold fuels, this being partly as a result of lesser heat units developed per unit volume. Where it is necessary to maintain high compression to obtain the rated power output, and yet maintain the engine at a moderate operation temperature, acclimatized alcohol engine fuels should be used.

Methanol base fuels are those which contain a major percentage by volume of this light, volatile, inflammable fluid. Methanol is derived from the destructive dry distillation of wood, or by a synthesis of carbon monoxide and hydrogen gas. Methanol is suitable fuel for spark ignition engines which have a compression ratio ranging between 7 to 14 to 1. When this fuel is used, engine cylinder head temperatures will be moderate. However, all the organic fuels contain alcohol to obtain maximum power. Impurities in the alcohol reduce the developed power output. If you desire to use methanol, it may be procured from your hobby dealer in prepared form. Incidentally, do not breathe the fumes because they are injurious.

Ether base fuels are those which contain a major percentage by volume of this light, volatile, aromatic, inflammable fluid which is obtained from the distillation of sulphuric acid and alcohol. Ether is classified as a hot fuel, and when nitrated with certain chemical derivatives is suitable as a fuel for either compression-ignition or glow plug ignition engines.

FUEL COMBUSTION—In order to dispense with the theory

of fuel combustion, suffice to say that approximately 15-1/2 parts air by volume are required to burn one part gasoline of equal volume. It requires 8-1/2 parts air by volume to burn one part alcohol. The complete combustion of the fuel charge is the desired optimum condition of engine performance, but this is not usually possible in actual engine operation. Inefficiency existing in the primary function of needle valve carburetion, and the unusually high engine rpm of small two-cycle engines, limit the degree of turbulence and mixability of the inducted fuel charge in the cylinder combustion chamber. Lack of turbulence in the fuel mixture caused by inefficient carburetion prevents the formation of a perfectly homogeneous fuel-air mixture; consequently it is necessary to obtain rated power output by supplying an excess of air to combust the fuel, this quantity being 15-1/2 to 18 parts air to one part fuel. The inherent waste of raw fuel ejected from the two-cycle engine exhaust ports lowers the developed power output. In short, all the fuel charge inducted into the cylinder cannot be completely burned.

VOLATILITY OF ENGINE FUELS—The volatility of a fuel is not necessarily an index of power which may be obtained by its use. Chloroform, ether, acetone and picric acid, when added to gasoline in minute quantities, assist engine starting operations but in general may not always be desirable engine fuel additives. It is fallacious to assume that the introduction of volatile fuel components to accelerate the vaporization of the fuel charge in the cylinder combustion chamber will always produce high power output. The limiting factor in this respect is the combustible range of the blended fuel mixture over which the fuel will vaporize and where the fuel mixture will become combustible. This range is variable, it being a function of the proportion of the basic fuel in relation to the additive.

Invariably, the addition of a blending fuel component to gasoline will restrict the range of fuel combustibility, and therefore the amount of the blending fluid added to a quantity of fuel must be accurately controlled. When mixing fuel with blending components, the use of graduated beakers and test tubes is recommended to control the quantity of the resultant mixture if good results are desired.

CALORIFIC VALUE OF FUELS—The calorific value of a fuel is defined as the heat produced from complete combustion of a unit quantity, at constant volume, in union with oxygen. This union produces heat which determines the calorific value of the fuel and is based upon a unit weight. Engine fuels may be rated on the unit calorific value per pound, and this is a criterion of the power which may be produced from a specific fuel charge provided the engine is operating at normal operating efficiency. Because power output is dependent upon the quantity of fuel burned in a specific time, it follows that a fuel of high calorific value is definitely desirable, and that the power output is directly proportional to the calorific value of fuel. In this respect straight run high test gasoline with the necessary anti-knock components blended with it is the best fuel for all general usage.

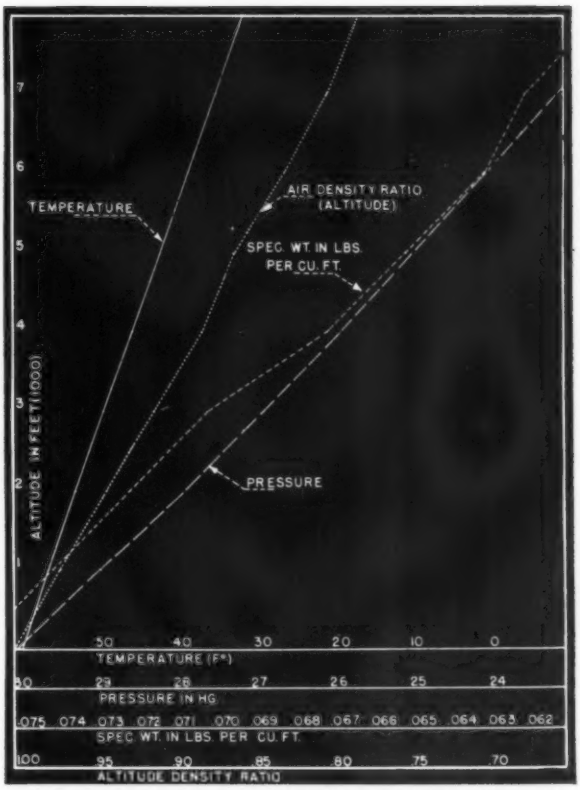
FREEZING OF FUEL—All fuels show an increase in viscosity when the temperature is reduced. Low atmospheric temperatures require a different setting of the needle valve from that used in warm weather. An increase in fuel viscosity causes a proportionate reduction in the induction velocity of the fuel charge into the cylinder at a slower rate of vaporization. Toluene, a derivative of the dry distillation of coal tar, may be added to engine fuel to lower the existing freezing point.

FUEL VISCOSITY—The viscosity of fuel is a function of the fuel temperature, which in turn is a function of the prevailing normal temperature of air. Fuel viscosity will change with any variation in engine temperature. Any noticeable change from sea level standard temperature (59°F.) will require a proportional change in the setting of the needle valve to adjust the quantity of inducted air. It will also affect the rate of flow of fuel through the fuel line to the mixing chamber, and this is to be considered where speed flights for records are to be undertaken. It may be assumed that the most desirable speed performance may be attained where a temperature of 59°F. and a barometric pressure of 29.92 inches of mercury prevails, although it may not develop the greatest speed performance attainable because of the high density of air at sea level. Therefore, optimum speed record trials should be undertaken when the temperature and the air density are in a compromising relation.

COMPOSITION OF MODEL ENGINE FUEL—To the novice who may be confused with all the special kinds of fuel blends now available, laboratory tests reveal that a specific quantity of straight run gasoline, when subjected to fractional distillation, will produce the following which may be considered to be capable of producing maximum of power for model engines:

(1) 20% of the fuel fractionally distilled at 200° F.
(2) 65% of the fuel fractionally distilled at 250° F.
(3) 15% of the fuel fractionally distilled at 340° F.

A specific quantity of fuel comprised of these three ingredients and mixed in these proportions will produce good fuel.



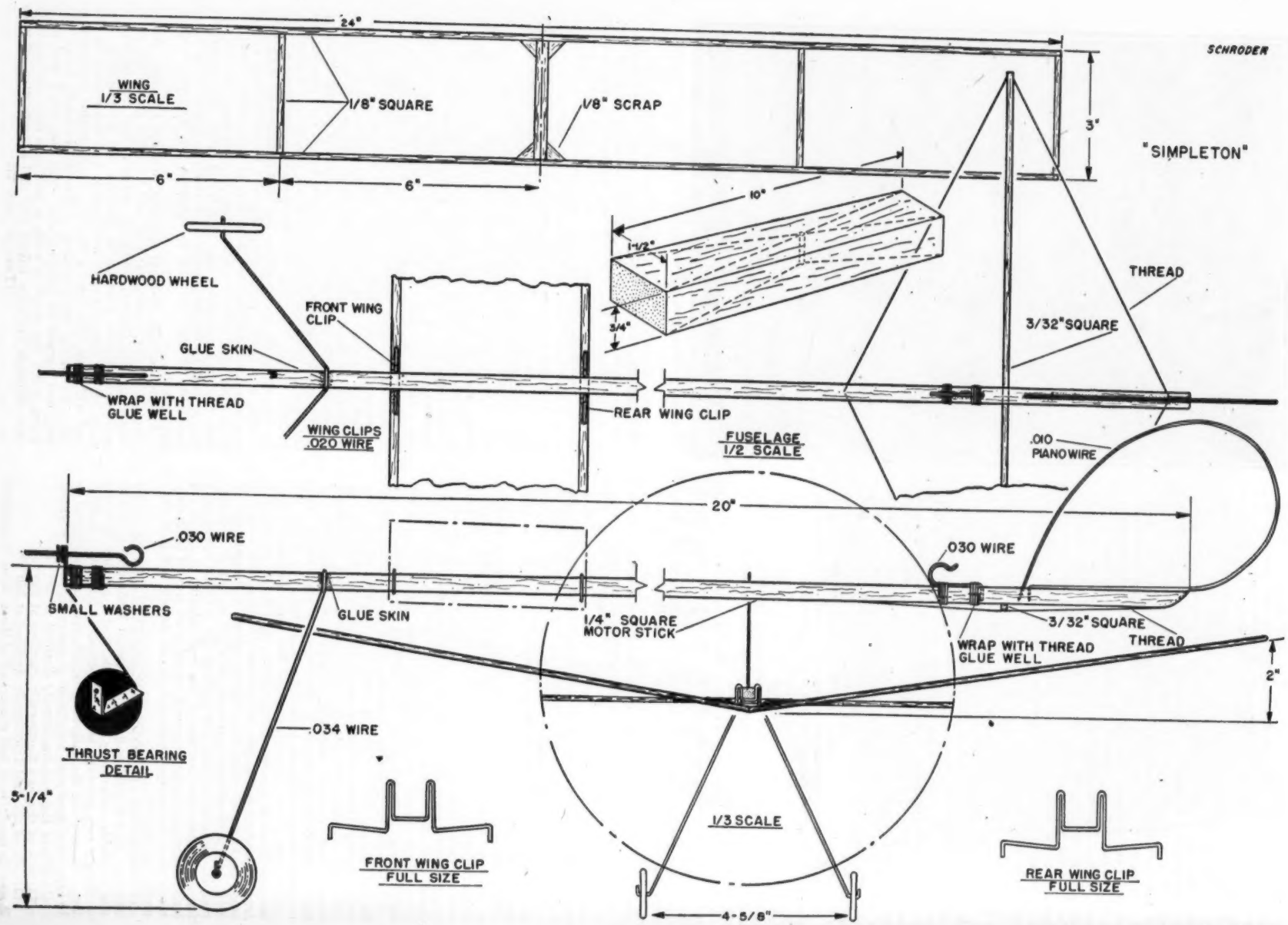
Changes in temperature and other readings as altitude is increased

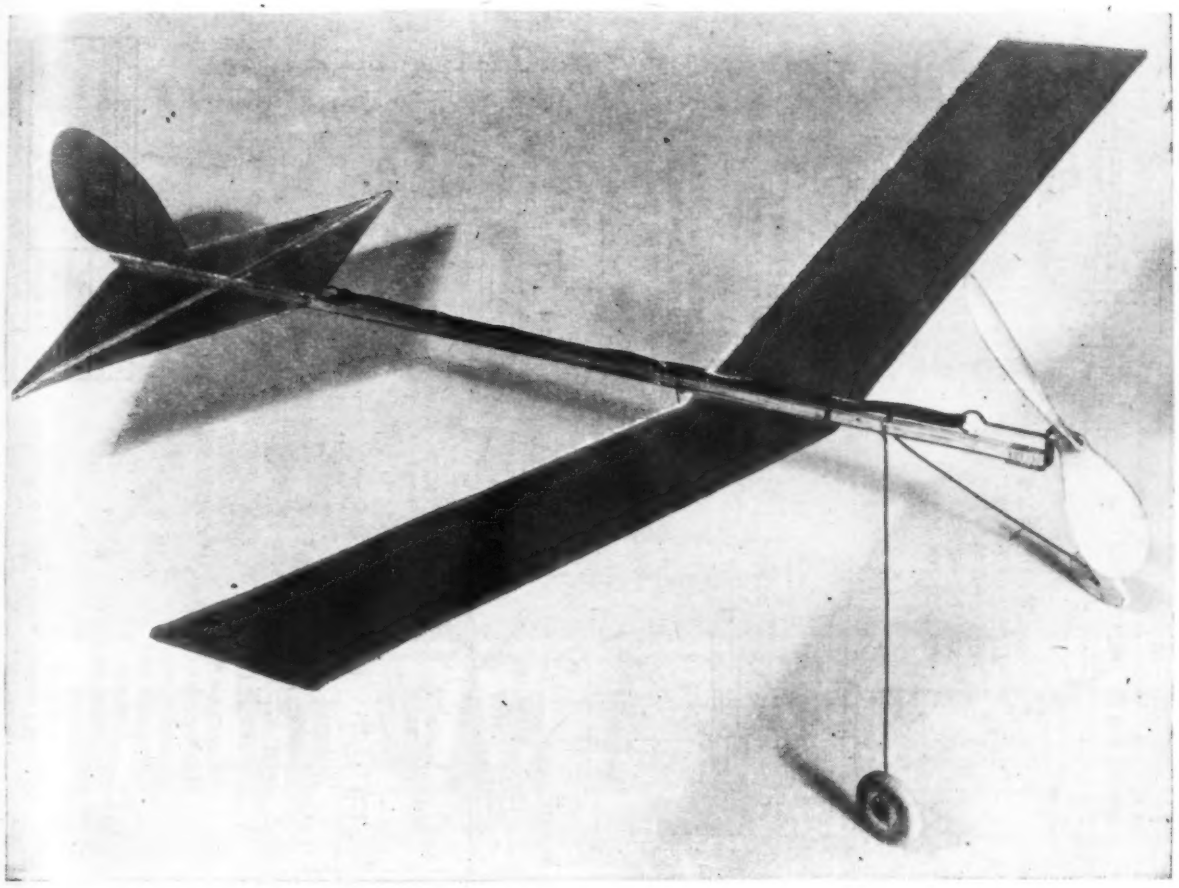
STRAIGHT RUN GASOLINE—If it is desired to experiment with the distillation of straight run gasoline to produce fuel in the proportions described above, an accurate Fahrenheit thermometer should be used, the source of heat should be an enclosed electrical heating unit, and the cooling coil should be enclosed in a bath of cracked ice. The retort should be glass. The end products should be drawn off after the vapors from the heated fuel have been condensed. The results of the distillation should then be thoroughly mixed together.

BLENDING COMPONENTS OF ENGINE FUELS—When the combustion of a fuel mixture is too rapid, the engine will knock when it is running at open throttle settings. This is injurious to the reciprocating components of the engine if prolonged, and the desired or rated power output will not be achieved. Knocking or detonation may be defined as an abrupt and violent explosion of the unburned portion of the fuel charge when the temperature and pressure in the cylinder combustion chamber reach critical values. Detonation causes pressure vibrations which literally tend to hammer the engine to pieces. Unfortunately the noise of engine knocking or pinging is usually not audible above the propeller, exhaust, or mechanical noises of the gas engine. The prevention of engine knocking is achieved by the introduction of anti-knock fuel components until a more complete combustion of the fuel charge is possible. In other words, the entire fuel charge is burned smoothly until the bottom of the power stroke has been reached by the piston instead of a partial combustion followed by an internal explosion of a portion of the fuel. Knocking or detonation also arises from fuels which, when subjected to pressure prior to combustion, tend to be unstable and may break down. The introduction of anti-knock fuel components tends to improve the combustibility of the fuel and to suppress the tendency toward detonation.

Aniline, acetone, di-ethyl selenide, di-ethyl telluride, tetra-ethyl of tin, tetra-ethyl of lead, and tri-ethyl arsine are anti-knock fuel components which are available and may be mixed with straight run gasoline to improve the performance. The ratio of the proportion of anti-knock fuel component to the fuel will vary, this being a function of the engine compression ratio, the needle valve setting, air humidity, needle valve setting, and normal air temperature. What may work well on a warm sultry day may not work so well on a cold low humidity day, although the same engine and fuel is used. Blended fuels

(*Turn to page* 43)


SCHRODER
"SIMPLETON"
24"
WING
1/3 SCALE
1/8" SQUARE
1/8" SCRAP
3"
6"
6"
10"
1-1/2"
3/4"
HARDWOOD WHEEL
FRONT WING
CLIP
GLUE SKIN
WRAP WITH THREAD
GLUE WELL
WING CLIPS
.020 WIRE
REAR WING CLIP
FUSELAGE
1/2 SCALE
THREAD
3/32"SQUARE
.010
PIANO WIRE
20"
.030 WIRE
SMALL WASHERS
GLUE SKIN
1/4" SQUARE
MOTOR STICK
.030 WIRE
3/32"SQUARE
THREAD
WRAP WITH THREAD
GLUE WELL
2"
.034 WIRE
THRUST BEARING
DETAIL
5-1/4"
1/3 SCALE
FRONT WING CLIP
FULL SIZE
REAR WING CLIP
FULL SIZE
4-5/8"



the simpleton

by BILL WINTER

THIS big R.O.G. has long been a favorite with us. Extremely simple construction and good performance make it ideal for a little easy fun. You can make it in an evening. And you can fly it . . . well . . . probably until you lose it.

While the construction requires no explanation—all the dope being on the plan—there may be a couple of fine points you will want to know about.

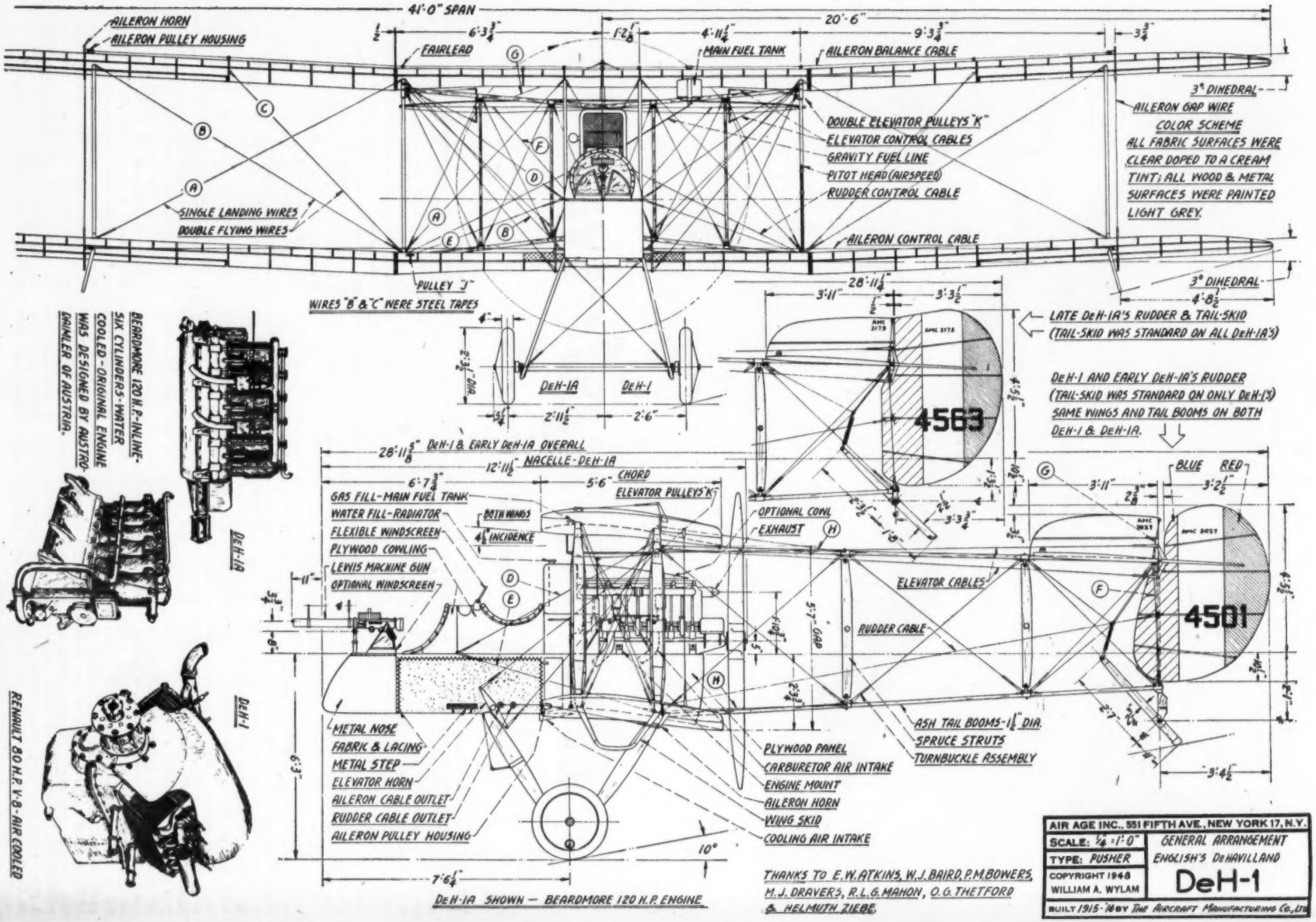
First, there is the matter of a thrust bearing. We don't know what the average model dealer will say, but we find that a simple thing like a thrust bearing seems to be as scarce in the model shops as hen's teeth. If you can get a thrust bearing from your dealer, select a large, tough one. If he doesn't have any that look as if they can stand the gaff, figure on making your own. We found that a bobby pin made a serviceable bearing. After bending it to an L-shape, we filled the eye with solder. This was done by holding the pin against a hot iron and sweating the solder into the eye. Then the prop shaft hole was drilled. Make a small drill by cutting off a short length of the same size wire as the shaft. Another way of making this bearing is to bend double a piece of music wire, then bend it to an L-shape, and finally fill the eye with solder. Or a triangular block of hard balsa and a bushing or large washer will stand up to hold that prop. In any event, bind with thread and cement well.

Now, that tail is a bit different. The thread outline for the stab works very well. Just keep in mind that none of the surfaces on this ship are doped; use just enough dope to attach the edges of the paper. We cut out a piece of tissue which overlapped the tail about 1/4 inch all around. This extra edge was doped lightly then folded over. Done properly, the thread edging is not pulled in. The rudder is the essence of simplicity. Don't use pliers, except on a sharp-angle bend. The trick is to loop the wire as you would a loop of limp cord, then insert the ends into the motor stick. The shape hardly matters and the loop may be any shape you want, as long as the area is about as shown. To cover, cut out a piece of tissue, brush cement *along the wire*, then press down the rudder onto the paper. Rub the paper smoothly into place—this is quite easy—then trim off when dry.

On the wings, the thing to remember is *not* to dope the tissue. If you do—the wings will surely twist. If you like, the outside corners of the edges may be rounded slightly with sandpaper, but despite square strips—this little ship has excellent performance. The first time we saw a job like this we made a bet with its owner that we could beat it with an identical model, but with a cambered wing. We lost the bet! Apparently the relationship of drag to power and, more particularly, to duration of power run, is very important on rubber jobs. Maybe we overdid the camber, but that fellow's flat-winged model really outperformed our cambered-wing.

Harking back to the hobby shops, you may find trouble in getting the proper size wire. Having wire on hand we got temperamental (as you will see) and used different sizes for shafts, fittings —and gear. But for one all around size, the dealer may have only 1/32" diameter. Use it for everything—if you must.

Flying is the usual deal of finding trim by moving the wing back if the ship climbs excessively or stalls, and moving it forward if the model dives. Inasmuch as the model won't break easily, dispense with the hand glides and begin by putting in 20 turns or so, adding turns as trim is obtained. To launch, move model forward gently and smoothly, letting it fly itself from your hand. Don't forget a drop of oil on the prop shaft.



BEARDMORE 120 H.P. INLINE-SIX CYLINDERS-WATER COOLED-ORIGINAL ENGINE WAS DESIGNED BY AUSTRO DAIMLER OF AUSTRIA.

DeH-1A

RENAULT 80 H.P. V-8-AIR COOLED

DeH-1

DeH-1A SHOWN — BEARDMORE 120 H.P. ENGINE

THANKS TO E.W. ATKINS, W.J. BAIRD, P.M. BOWERS, M.J. DRAYERS, R.L.G. MAHON, O.G. THETFORD & HELMUTH ZIEBE.

AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.	
SCALE: ¼" = 1'-0"	GENERAL ARRANGEMENT
TYPE: PUSHER	ENGLISH'S DeHAVILLAND
COPYRIGHT 1948 WILLIAM A. WYLAM	DeH-1
BUILT 1915-'16 BY THE AIRCRAFT MANUFACTURING Co., Ltd.	

A De Havilland design, this B. E. 2 flew unusually well for its day

WORLD WAR I

by ***ROBERT C. HARE***

This D. H. 4A was used by 67th Sq., A. F. C. stationed in Palestine

Original D. H. 1 with Renault engine showed fine stability when Geoffrey De Havilland flew it with hands-off

THE World War I airplane under discussion this month is one of the those that takes us back nearly 30 years in the history of aviation to its origin and to its originator. The airplane is the De Havilland 1 and its production counterpart, De Havilland 1a; its designer is Geoffrey de Havilland.

By way of background for the D. H. 1 series, let's go back to 1910 and to the Army Balloon Factory at Farnborough, England. The British Army was just becoming aware of the potential value of heavier-than-air over lighter-than-air craft and had hired a new designer, chief test pilot and technical assistant all wrapped into one—young Geoffrey de Havilland. He had successfully built and flown two airplanes prior to that year, and as such was a man of no little achievement in the aeronautical world.

In his position, de Havilland soon became a prominent figure in government experiments at the Factory, particularly in reconstructing "unserviceable" aircraft into new, practical designs. De Havilland's reputation was made, as far as the government was concerned, when he took the official S. E. 1 and worked it over into a fair flying machine. One of his first complete designs at the Factory was the B. E. 1, soon redesigned into the B. E. 2, which was the best airplane of 1912 and in subsequent modifications performed some notable war service.

About this time, the theoretical work on automatic stability in aircraft which had been under investigation for some time by Bryan and Bairstow was given the acid test by a series of full scale experiments at the Balloon Factory. De Havilland, of course, was in the middle of things insofar as design was concerned. Laboratory work was done principally by Dr. F. A. Lindemann, later Lord Cherwell, and E. T. Busk, who had taken the original de Havilland-designed B. E. and redesigned it into the B. E. 2c.

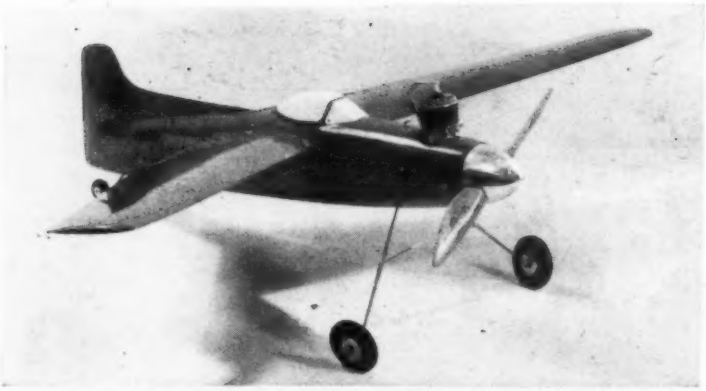
From this experimentation de Havilland designed the R. E. 1, a tractor biplane, and the first inherently stable airplane in the world.

Meanwhile, de Havilland's original pusher biplane, which he brought to the Balloon Factory with him, was being developed by the Factory staff, and the F. E. 1 came into being. The F. E. 2 was next developed, using B. E. 2 outer wings in an effort to evolve a standardized line of air-

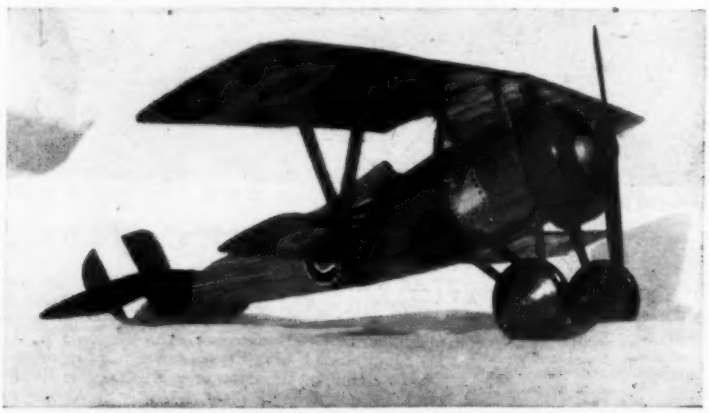
(*Turn to page* 48)

AIR WAYS

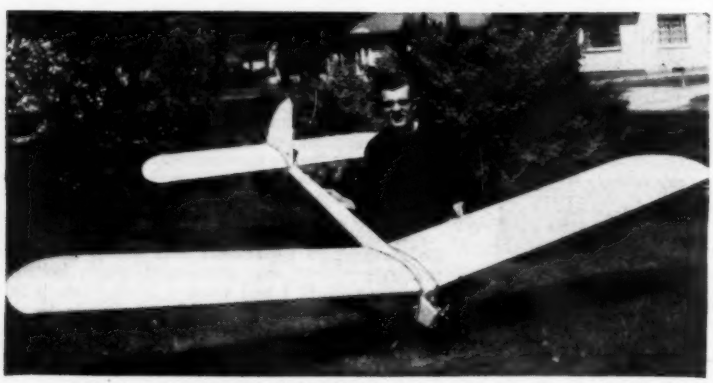
NEWS OF MODEL AIRPLANE ENTHUSIASTS ALL OVER THE WORLD



No. 1 Very successful tailless design by Paul Stahlhuth is completely stable



No. 2 Nieuport Scout built in Sweden by Rigo Lindgren has been whip-flown



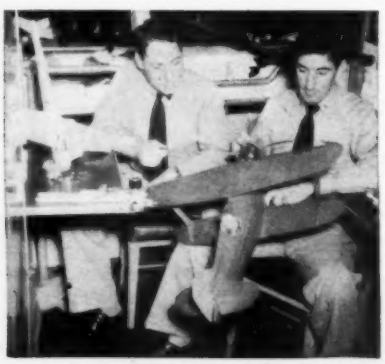
No. 3 Russ Porath says he built this 10' giant to give free rides to friends

THE CO2 CONTEST field is at present wide open, with the very minimum of rules and restrictions imposed upon this new event. Enough experience has been gained by contest directors to begin formulating their recommendations to the AMA contest board, covering the rules to be flown under next year. While there already have been all sorts of unofficial proposals, it seems that the present rules cover the situation pretty well. Some authorities have felt that classes based on displacement—as in gas engine events—might be advisable. There have been two CO2 powerplants available, and recently a new one was added halfway between the original two in size; thus, three classes would be called for. However, there is plenty of evidence to show that the small and large engines can compete together on quite an equitable basis. Final proof is, that as this is written the AMA official CO2 record (over 23 minutes) is held by the smallest engine in the field. Thus it seems to be a case of getting as much gas tank capacity in your ship as possible (up to the present allowed maximum of one cartridge-full) and using this gas to best advantage.

One idea mentioned has to do with the setting of CO2 records. It is felt in some quarters that, at least for record purposes, some differential should be figured in the flying time based on air temperature when the record was made. As any of you who have flown a CO2 well know, these powerplants act much differently on cool days than when flown on a scorching summer day. The difference of course is caused by expansion of the gas with heat—but it would admittedly be a difficult task to work out a simple rule satisfactory to all. This proposal, however, is indicative of the amount of thought being expended on this new form of power.

This magazine has devoted considerable space to the description of models propelled by CO2 powerplants; we have done so since the first such powerplant reached the market a year and a half ago. We have been plugging CO2 not as a rival to rubber or gas power, but as a supplement and valuable link between these well

No. 4 B. Hockin and his Canadian prize winner



No. 5 D. Jackson builds in cramped quarters

No. 6 O. K. Foster built this *Joker*

No. 7 Stinson LS from M.A.N. plans by J. Gonzalez

established forms of propulsion. CO2 has proven a boon to beginners and a blessing to the jaded oldtimers who want to try something new. Judging from the wide and increasing interest in CO2, we feel sure our policy has been sound.

READYMADE AUDIENCE. While the idea may have been employed before, the first combined model plane meet and baseball game to come to our attention was recently held in Newark, N. J. The meet was arranged by Leon Shulman and sponsored by the local Plymouth dealer; top prize was a free trip to the Second International Meet in Detroit.

The baseball game started at 2 p.m., and as soon as the players left the field the controliners took over. Since the combined show had been well advertised in advance, the crowd at the game knew something was to be added and many stayed for the model show instead of rushing for the exits at the last strike-out. Thus the modelers had a good audience—many of whom would probably never have gone to the meet otherwise—and it is certain that many of the new spectators received a good introduction to model aviation that they would otherwise have missed.

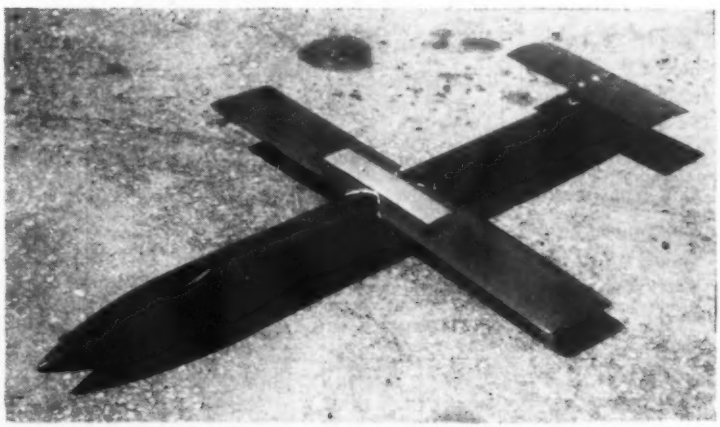
SINCE MODEL MEETS are growing larger and more numerous all the time, many proposals to correct the more obvious shortcomings are continually being advanced. For example, the lack of experienced timers at many meets has led to the suggestion that a group of licensed and paid contest officials be set up. At least the certification of timers (see May 1948 *Air Ways*) is a step in the right direction, and we predict this practice will spread if intelligently handled.

A note from Jack Hassett, model shop owner of Philadelphia, suggests that contest winners be given useful model merchandise plus a trophy, rather than just a large trophy which, however impressive, doesn't much help the modeler who has to spend his last dime to compete in contests.

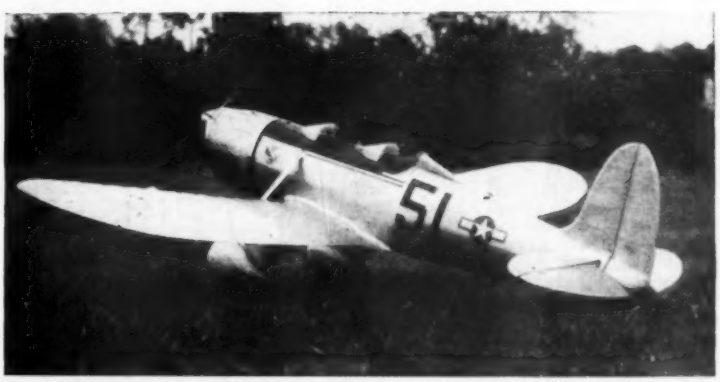
It is also suggested that four classes be established for competition: Junior—ages up to 16; Senior—up to 21; Adult—over 21; Open—

(*Turn to page* 58)

No. 8 Super detailed S6B racer is a product of Ivan W. Moore, England



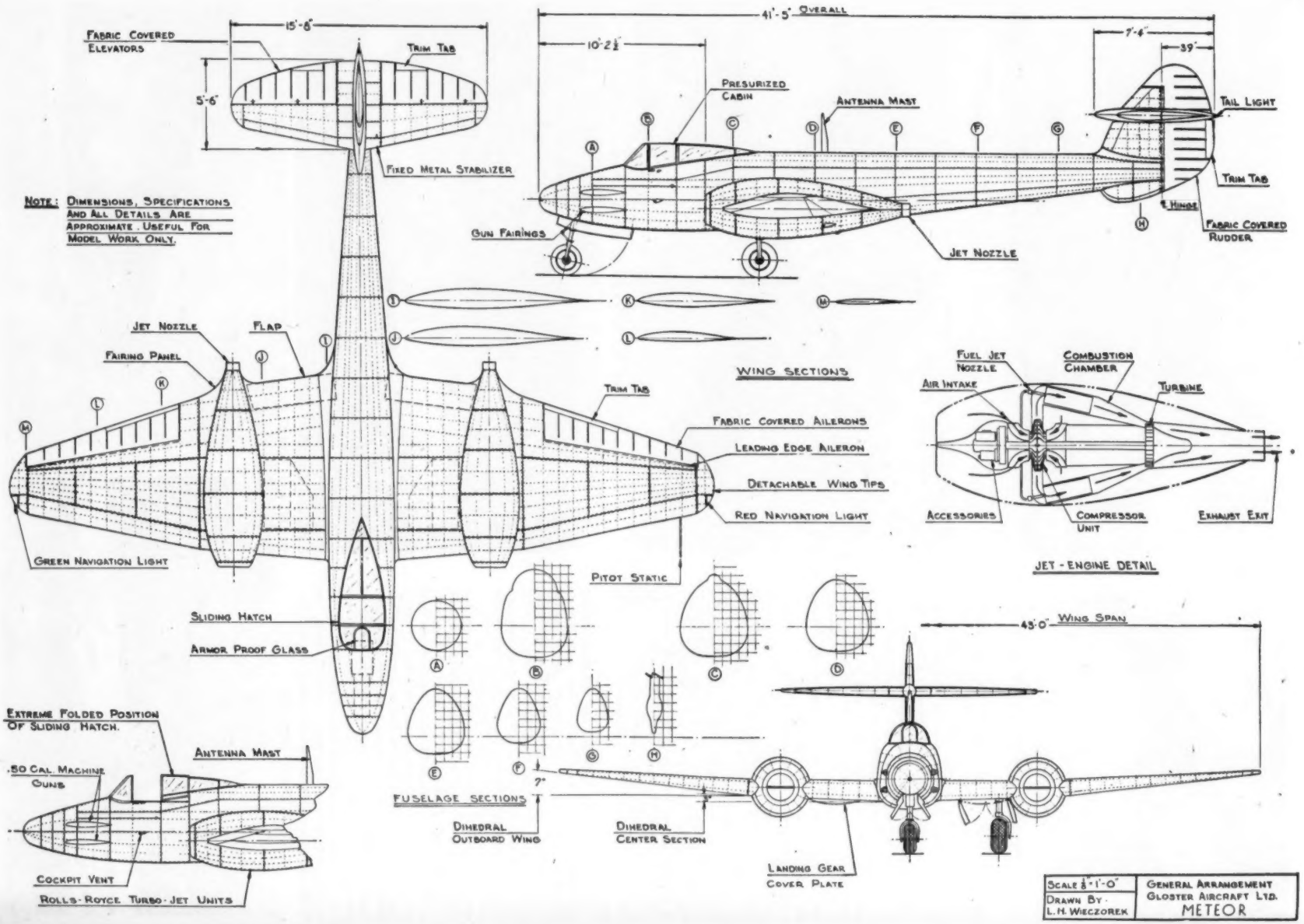
No. 9 Gervais Nolin calls this jet job *Guided Missile* and says it performs well



No. 10. Scale *Ryan ST* by J. W. Glasscock is built to 1½" scale and powered by *DeLong 30*

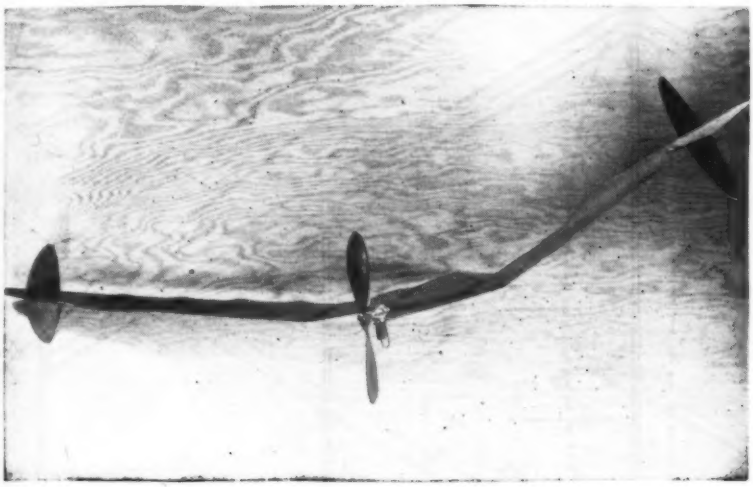
No. 12 Experimental thin airfoil was used by Ted Morlock on this ship

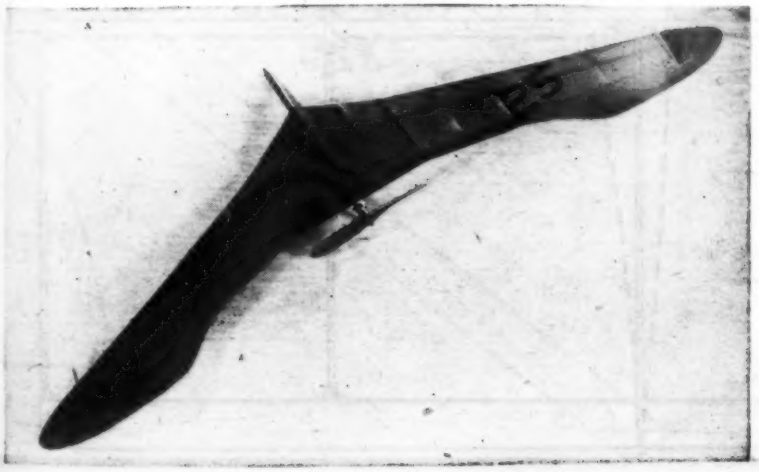
No. 11 Harold Buston's Piper Cub has *Viking Twin* engine and 7' span


FABRIC COVERED ELEVATORS
15'-8"
TRIM TAB
5'-6"
FIXED METAL STABILIZER
NOTE: DIMENSIONS, SPECIFICATIONS AND ALL DETAILS ARE APPROXIMATE. USEFUL FOR MODEL WORK ONLY.
41'-5" OVERALL
10'-2½"
7'-4"
39"
PRESURIZED CABIN
ANTENNA MAST
TAIL LIGHT
TRIM TAB
HINGE
FABRIC COVERED RUDDER
GUN FAIRINGS
JET NOZZLE
WING SECTIONS
JET NOZZLE
FLAP
FAIRING PANEL
TRIM TAB
FABRIC COVERED AILERONS
LEADING EDGE AILERON
DETACHABLE WING TIPS
RED NAVIGATION LIGHT
GREEN NAVIGATION LIGHT
PITOT STATIC
SLIDING HATCH
ARMOR PROOF GLASS
FUEL JET NOZZLE
COMBUSTION CHAMBER
AIR INTAKE
TURBINE
ACCESSORIES
COMPRESSOR UNIT
EXHAUST EXIT
JET-ENGINE DETAIL
43'-0" WING SPAN
EXTREME FOLDED POSITION OF SLIDING HATCH.
ANTENNA MAST
.50 CAL. MACHINE GUNS
COCKPIT VENT
ROLLS-ROYCE TURBO-JET UNITS
FUSELAGE SECTIONS
7"
DIHEDRAL OUTBOARD WING
DIHEDRAL CENTER SECTION
LANDING GEAR COVER PLATE
SCALE ⅛"-1'-0"
DRAWN BY L.H. WIECZOREK
GENERAL ARRANGEMENT
GLOSTER AIRCRAFT LTD.
METEOR

Buzz Bat

by **FRANK EHLING**





THE CO2 motor has given the modeler a chance to display his talent for design, because the model can be built quickly, and if there are any changes they can be made easily. The engine can be run at any speed to get the ship to do just what the builder wants. The engine can be made to run in either direction, which is handy when you want to make a pusher or tractor; none of the work of carving the prop is lost since it can be slipped on the shaft either way.

Now all we need are a few brave modelers to give us something a little different from that pylon design (the pylon *is* the best under the AMA duration rules). It may be a good idea if clubs would add a design event to their contests, with some nice prizes—that's the best way to get modelers working.

When the *Buzz CO2* engine was announced we wanted to try it right out, and the flying wing looked best to us for the purpose. A flying wing is simple; dihedral in the wing is used for lateral stability; sweepback with upturned wing trailing edges gives longitudinal stability. The rudders are placed at the wingtips as this is the point farthest behind the C.G.

WING—As there isn't any fuselage to slow us up we'll start right in on the wing and cut out the ribs along with the spars and trailing edges. Lay out the spars over the plan and cement ribs in place. (Use wax paper over the plans, of course.) The leading edge can now be cemented in place. Cut out the wingtips—from bending stock, because they will have to be warped later to make the wing glide properly. Sand the wing frame smooth—this is important because only with a smooth frame can you do the best covering job. If the framework is rough the covering job will look as if it was done in the dark. When you are sure the wing is smooth, go over any weak joints with cement because if the wing is weak it will warp out of shape when covered.

Cover the wing in sections: 3 on top and 3 on the bottom. Spray with water; when dry, coat with dope diluted 50% with thinner. Dope is rough on light structures so add a few drops of castor oil to your thinned mixture to keep the dope from pulling the wing out of shape.

The rudders can now be cut out, sanded smooth and cemented in place. Be sure they are cemented on straight as it takes only a little rudder to force your model into a turn.

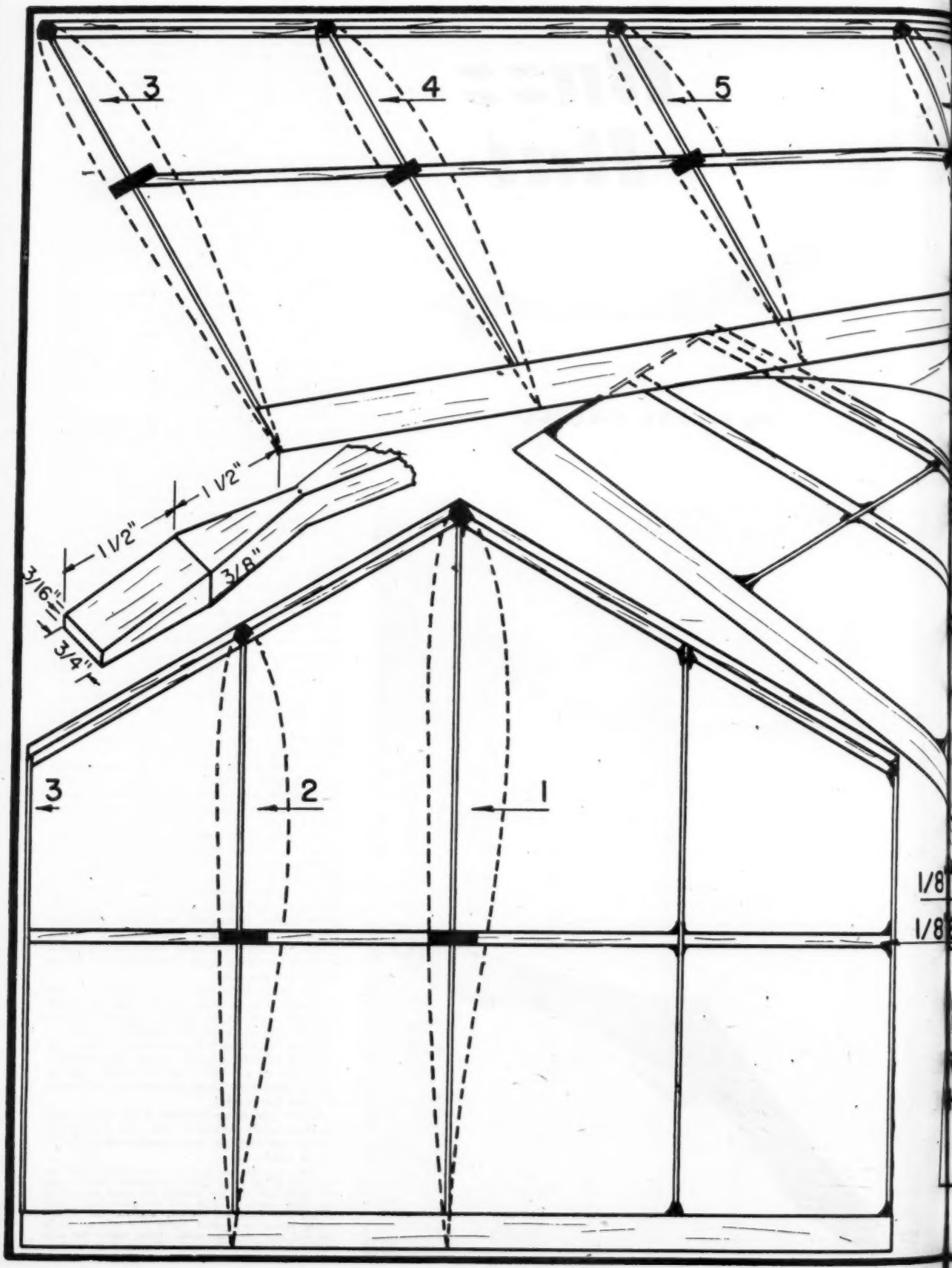
The tube that holds the tank and motor is bent around a dowel. Cement a plywood bulkhead to the end, cement the seam well, and attach the motor. Fasten the tube in place on the wing and, when dry, slip in the tank and glide the ship. When the glide is flat (obtained by sliding the tank back to check a dive, and forward to kill a stall*), cement a balsa block to the front end of the tube and streamline to shape shown on the plan.

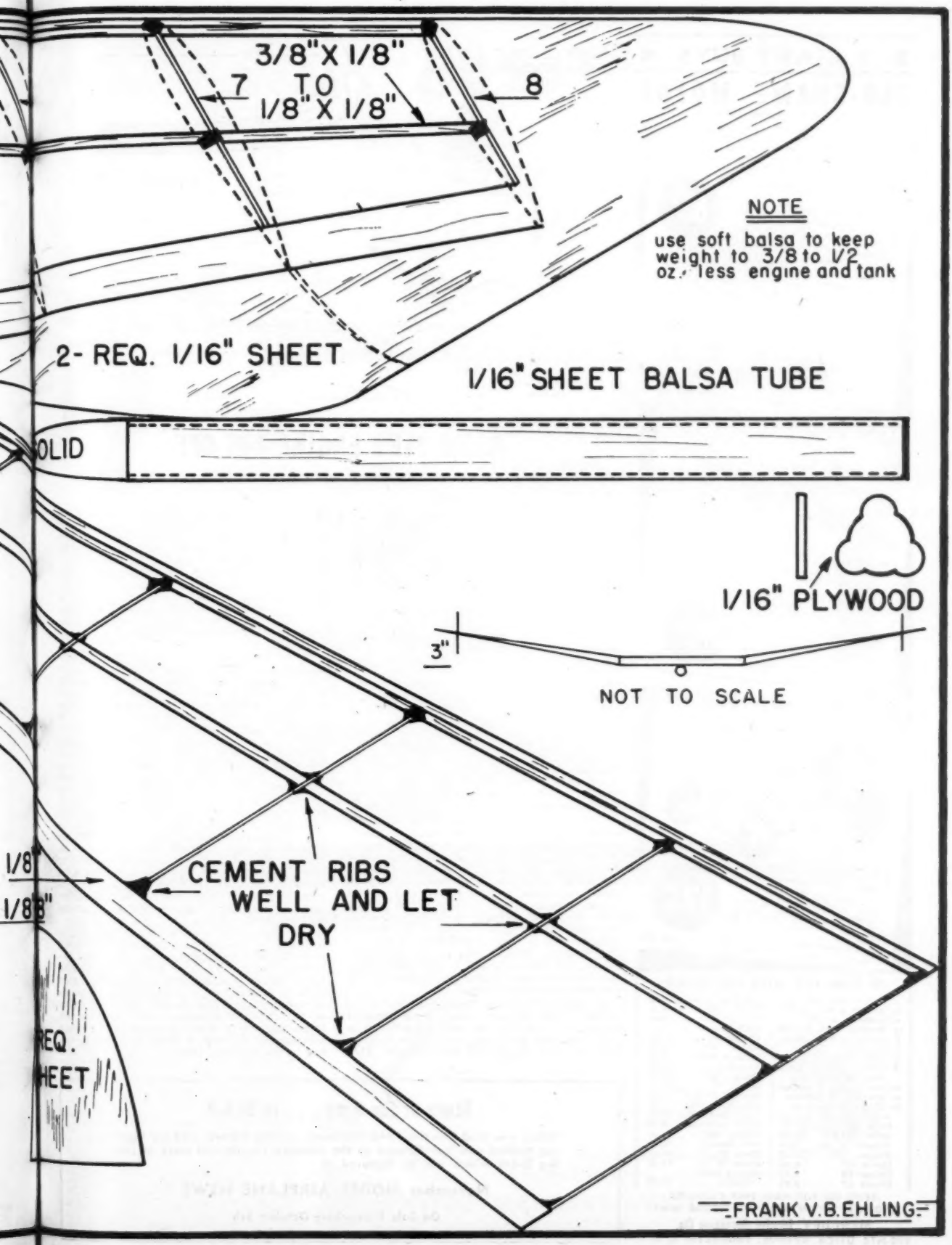
The prop is carved from a block of bass or pine. Carve thin blades, but be sure to dope well as too light a prop is hard to get running in the direction you want.

There isn't much to say about flying the wing as adjusting is very easy. Bend up the wingtips to get the ship to climb, and if one is bent more than the other it will tend to turn the model.

When you have finished your model and learned what makes it tick, you will want to try one of your own design—they are a lot of fun!

*Note that the tube from the motor runs to the forward end of the tank. Don't reverse the tank—if you do, liquid CO2 will run through the motor as soon as the model starts to climb and the motor will immediately slow down and probably stop running. If the tubing is run as specified, liquid CO2 will not reach the feed pipe when the model climbs, and if the nose should point down the motor will stop—a good safety feature!


3
4
5
1 1/2"
1 1/2"
3/8"
3/16"
3/4"
3
2
1
1/8"
1/8"


3/8"X 1/8"
7 TO
1/8"X 1/8"
8
NOTE
use soft balsa to keep weight to 3/8 to 1/2 oz. less engine and tank
2- REQ. 1/16" SHEET
1/16" SHEET BALSA TUBE
OLID
1/16" PLYWOOD
3"
NOT TO SCALE
1/8"
1/8"
CEMENT RIBS WELL AND LET DRY
REQ.
HEET
FRANK V.B.EHLING

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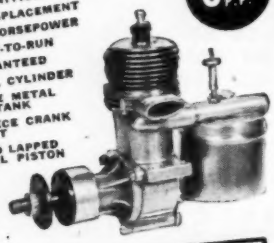
- 1 PIECE CRANK SHAFT
- HAND LAPPED STEEL PISTON



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With GLO-CHAMP MOTOR

"The Flipper"

- STUNT & SPORT
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- KIT ALONE $3.50
- Combo is complete — Motor • Flipper • Prop • Glo plug • Stunt tank • Cement • Dope • Knife • etc.
- De Luxe outfit with Ohlsson "23" $12.00

Nothing Else to Buy Just Build and Fly

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COMPLETE RACE CAR COMBO

NOTHING ELSE TO BUY ASSEMBLE AND RACE

- GLO-CHAMP MOTOR
- THIMBLE DROME RACE CAR
- MERCO CONVERSION UNIT

Contents of Unit

Copper Gas Line • Nuts & Bolts • Special Aluminum Mount • Precision Hub-Flywheel & Wrench • Complete Plans & Inst. etc.

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20 ITEMS FREE WITH GAS MOTORS

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- Steel Ruler
- Model Pliers
- Plastic Handle Screw Driver • Ident. Tags
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Arden .099 P.B.	$12.50
Arden .099 B.B.	15.50
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Ohlsson 23	9.95
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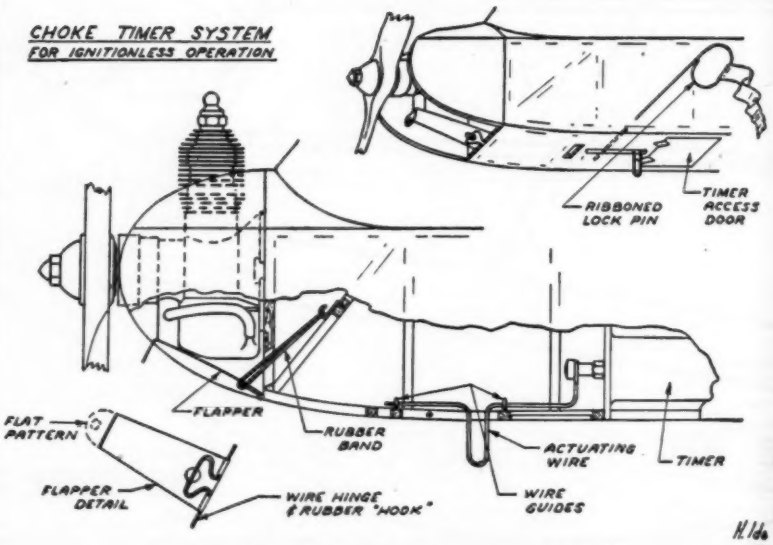


GLOW PLUG ENGINE CUT-OFF

By JAMES G. BERRY

IF YOU are like me, the appearance on the market of the new "Glow Plug" for the Arden engine was the occasion for a shout of joy, because it meant the elimination of the major problem and trouble inherent in the operation of miniature two-cycle engines—*no coil, condenser, or flight batteries!*

However, the elimination of the flight batteries and timer hook-up meant that I would have to devise another practical method of stopping the engine in order to keep engine runs within the usual "free flight" contest limits.

Luckily or coincidentally, the 1947 model Arden's air intake utilized the "up-draft" principle of operation. With the air intake located on the forward bottom portion of the engine in a relatively clear and unobstructed area, I set about to design some means of cutting off the air supply at the appropriate time, i.e. at the end of the desired engine run. Obviously, lack of air would upset the required fuel/air ratio, choke the engine with fuel, and stop it.

The accompanying drawing shows how I accomplished my purpose—using a timer, some miscellaneous wire, some sheet metal and tubing. I cut a flapper out of thin sheet brass of a size which would close off the air intake when in the "up" position. A small extension on the lower end of the flapper was bent over a piece of 1/16" music wire to form a hinge. Another extension provided on the opposite end of the flapper and bent to a right angle from it acts as the "trigger." Drill a hole in this extension which will accommodate a 3/32" wire from the timer—it should provide a close fit, but not too tight or too loose.

In order to provide "instantaneous" snap action of the flapper, install a rubberband in such manner that one end is anchored to your ship and the other end to the flapper. The drawing illustrates one method. This rubberband must be powerful enough to overcome the air loads when actuated and yet not so strong that it will bind up the trigger action. A little experimenting will tell you when you have the right combination. Install the flight timer in the lower portion of your ship's fuselage so it will be accessible for adjustment and so that a nearly "straight line" actuation of the trigger will result. The trigger actuating wire extends from the timer plunger forward to the flapper.

When the timer plunger is in the retracted position, the actuating wire must have just "released" the flapper trigger. Provide a 90° "out and back" bend in the trigger actuating wire, extending through a slot in the fuselage bottom surface to act as a cocking handle. Depending on the peculiarities of your installation, at least one and preferably two guides must be installed to keep the trigger actuating wire in position. A music wire pin, installed so it will extend across the fuselage just behind the cocking handle (in its full extended position), serves as a safety lock until you are ready to launch your ship. Make a finger loop in the pin for quick release. You will find, in actual use, that a short time lag between flapper actuation and engine stop occurs; this varies with the individual engine. Obviously, you must include this lag in determining your flight timer setting in order not to exceed the engine run limit under which you are flying.

The installation shown on the drawing is internal; a simpler and more easily built and adjusted installation can be made externally on the fuselage bottom. Leave the timer inside but bring the actuating wire outside through a guide made from a piece of tubing. Bend the trigger on the flapper in the opposite direction and you are set to go. Be sure to provide access to the timer adjustment through a small door or opening in the fuselage bottom.

Story of the Nats . . . in M.A.N.

When you read this the 1948 Nationals will be history, and we know our readers will look forward to the pictures, results and story of this Big Event which will be featured in

November MODEL AIRPLANE NEWS

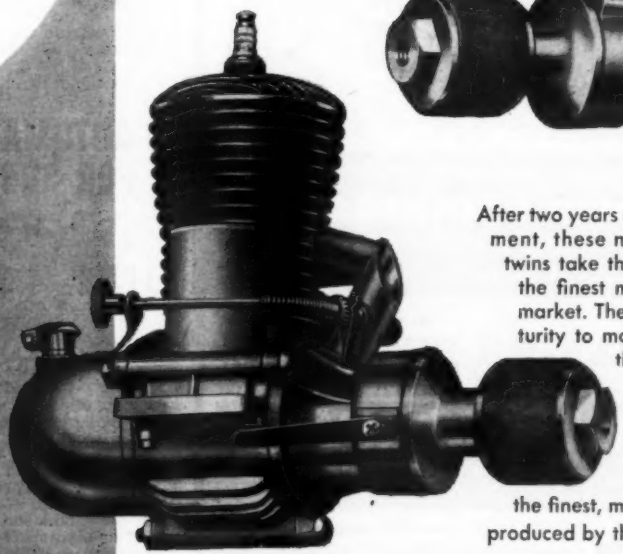
On Sale Everywhere October 8th

THE YEAR'S GREATEST NEWS

Bill Atwood's "TRIUMPH'49" "TRIUMPH'51"

$20.00 for "Triumph '49 or '51". Complete, with timer and spark plug.. **$18.00** for "Triumph '49 or '51". Complete, less timer and glo-plug.

YEAR'S GREATEST NEWS · THE YEAR'S GREATEST NEWS



After two years of research and development, these new Atwood "Triumph" twins take their proper place among the finest miniature engines on the market. They bring engineering maturity to model flying. They double the value and satisfaction of individual ship design. Sterling quality throughout. All die cast parts are jewels of accuracy, judged to be the finest, most precise workmanship produced by the die casting trade.

THE YEAR'S GREATEST NEWS · THE YEAR'S GREATEST NEWS · THE YEAR'S GREATEST NEWS · THE YEAR'S GREATEST

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SPECIFICATIONS

Two-cycle—2-port—rotary valve with "ROPAK"—Bore for the '49: .890—Bore for the '51: .900—Stroke, .790 for both engines—weight, 8½ oz., both engines—compression ratio 7½-1. Crankshaft machined from solid alloy steel, hardened and ground between centers. Crankpin ground for accuracy and alignment. Cone rod employs bushing at both ends, and oil hole. Permanent mold piston, 195 alloy, heat-treated. Tubular wrist pin, hardened and ground, supplied with Dural end nuts. Alloy steel cylinder sleeve. Full 180 degree porting. Light weight, fuel-resistant gas tank. Flexible type needle valve with positive lock. Radial or beam mount.

Since both engines are identical in weight and mounting characteristics, you now can fly one airplane in two classes! Simply change engines, and forget about making other adjustments on the ship! All Atwood power plants, dating from the original Baby Cyclone, have been equipped with the popular rotary type valve. This engineering principle has been further improved by the addition of "ROPAK," a design feature which eliminates air starvation at virtually all operating speeds. Further, the new "JUSTEX" timer insures fast, simple point adjustment.

ATWOOD "JUSTEX" TIMER

Instant adjustment. No special tools or wrenches needed. Simply loosen lock screw, rotate hardened timer bearing to adjustment point required and tighten lock screw.

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The increased performance of "Triumph" engines is due in part to this new style air accumulator chamber, an integrally-designed booster of engine efficiency.

ENGINES INDIVIDUALLY RUN-IN AND CHECKED WITH ELECTRIC TACHOMETERS.

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Gentlemen:
Enclosed please find check in payment of your invoice #17604. May we take this opportunity to congratulate you for your prompt attention to orders and to assure you that we will deal with you at every opportunity.
Cordially,
Harry Critchley
Glad to hear it, Harry And thanks for those kind words!

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Glo-Torp "32"
Glo-Torp "29"
Glo-Torp "24"

Price $14.95 (WITH PLUG)

SPECIFICATIONS	"32"	"29"	"24"
BORE	.750	.725	.662
STROKE	.724	.724	.724
DISPLACEMENT	.318	.299	.249
WEIGHT (Bare)	6 ozs.	6 ozs.	5½ ozs.
TYPE	2 CYCLE ROTARY VALVE		

The Famous TORPEDO "29" *18.50* less C&C

This famous CHAMPION is known for its many CONTEST WINNINGS...The result of the skill of its maker and the high quality materials used...Every K & B engine FACTORY TESTED and GUARANTEED. Know you are getting the very best...INSIST ON K & B!!

Also available in the K&B "24" ***—Price 16.50*** (less C&C)

NOTE: Specifications same as shown above for "Glo-Torp" ("29" & "24") WEIGHT 7½ ozs.

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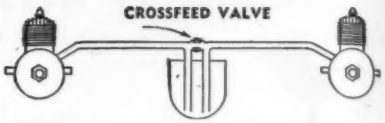
Multi-Engine Operation

by LEONARD V. MARES



FOR U-control models, the failure of one engine in flight is not serious since the model can be worked on the three line system with both engines operating from one battery, and cutting the ignition will immediately preclude the turn into the dead engine.

However, in free flight models the easiest method of making both engines quit almost simultaneously is to use a crossfeed gas line with a single tank. The crossfeed valve must be off to start each engine. It is turned on as soon as both engines are operating, and if one engine should quit due to any cause the other will run a second or two until air sucked in through the crossfeed valve from the dead engine's carburetor will kill the good engine and prevent a power spiral. The time that the remaining engine will run depends on the amount of fuel left in the crossfeed lines, therefore these should be of the smallest diameter consistent with full power operation.

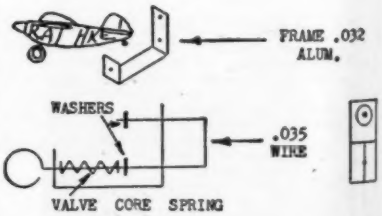
AUTOMATIC RELEASE FOR RUBBER MODELS

by JIM RATHKE

HERE is a device that may be used for many purposes on a rubber model. For instance, it can turn a rudder tab at the end of the motor run enabling your plane to climb in one direction and glide in another. It can be installed in any model easily. Plans are for a release in a model taking 6-8 strands of rubber.

This release works because of the tension of the motor. The hook is free to slide forward when the rubber is wound. When the rubber unwinds, the tension exerts less pull on the shaft and the latter is forced rearward by the spring. A thread tied to the shaft can pull a tab or trapdoor at the end of the motor run.

The main part—the frame—is a strip of aluminum .032"x5/16"x2-1/8". Bend this to shape shown on the plan and drill 3/64" holes at the points where the wire passes through it. The shaft is bent from .035" wire *after* it is through the frame and the valve spring with washer slipped on it. The two washers should be soldered to the shaft and some rubber tubing placed over the hook to protect the rubber.



SUCCESSFUL FLIGHT TESTS of a fully retractable track landing gear on a Fairchild C-82 *Packet* points toward inclusion of this device as a regular production alternate installation on the giant cargo plane, as well as others of the type. The gear consists of an endless rubber belt mounted on familiar bogey wheels not unlike the farm Caterpillar tractor. Idea is that device spreads load of the airplane over a

wide area of ground, rather than the surprisingly small "footprint" of conventional aircraft tires on the runway. The new gear will permit operation of the heavy cargo plane over ploughed, partially cleared, muddy, sandy and other imperfect fields: a definite asset for wartime advanced area operation.

Design Forum

(*Continued from page* 17)

quite possible that Mr. Hoffman has misapplied this theory if it actually is the same theory.

In respect to his statement inferring that model engineering is 35 years behind the airplane designs, we believe it is more accurate to say that the *theoretical* technique of model engineering is behind that of full scale plane design. *Actual* results in regard to stability, regardless of whether or not they have been obtained by actual practice, is we believe ahead of large airplane design. Model builders have learned to make planes so stable that they will fly for hundreds of miles without a pilot balancing them. Large airplanes today seldom are capable of flying in this manner unless controlled by an automatic pilot or other automatic means. While several large aircraft have been known to fly without control for hundreds of miles, this is uncommon. The stability problem is even more difficult when applied to models, because a model has no pilot to control it and is more susceptible to air currents due to slower speed and smaller size. It gains little from the inertia of its mass because it is so light, and it can readily be turned from its flight course and normal flight position. When this occurs it must have the capacity to recover its balance.

To obtain a more complete understanding of the significance of the CLA effect, we offer the design of a simple test plane which you can build and fly yourself.

The plane may be powered either by a gasoline motor or by rubber. Rubber is much simpler and tests with this power are more apt to be successful, with fewer crackups. If you use rubber be sure to *overpower* the plane in order to simulate the flight effects of a gas engine plane respecting *speed* and *weight*, because the effect of the CLA position *is proportional to the square of the speed times the airplane's weight.*

The first test plane may appear as in Fig. 1. If a gas engine is used, nose length N (Fig. 1) should be 1/3 to 1/4 of distance M. We suggest a fuselage length of 26" and 28" wingspan. In Fig. 2 the wing is placed in an extreme parasol position mounted on a pylon with considerable side area above the fuselage. The stabilizer, for a rubber powered model, should be at least 35% of wing area. Fin area should be not less than 12%. The fuselage may be four sided, built up around 4 longerons with balsa covering on the sides to stand the strain of hard landings. Wing dihedral is approximately 10° or 1" rise on each wingtip for every foot of span. We suggest a propeller 9" in diameter, 12" pitch, powered by 16 strands of 1/8" flat rubber. The prop should be cut by the diagonal method from a block 9" x 1-3/4" x 3/4". A hardwood prop will give fine results and help to weight the nose of the plane for proper balance.

If this ship is underpowered it will *side-slip* during turns when in horizontal flight and not *skid* as *during fast flight.* If the plane is slow, the parasol wing will produce the opposite effect from that obtained with a fast model. It will be

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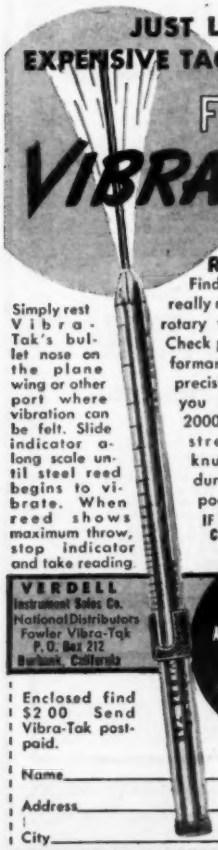

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stable in *slow* flight but spirally unstable in *fast* flight. Do not be afraid to build weight into it because this will emphasize the plane's true stability characteristics. If the nose points continually upward during flight, this type of airplane should give a spiral climbing flight. The significance of the high CLA will be most apparent when the airplane is trimmed to make horizontal, *high speed* flights. During such flights it will bank sharply so lift will react well out on the higher wing and the vertical component will be comparatively small. As a result the nose will drop while the center of lift remains out on the higher wing, resulting in a spiral into the ground. If by any means you adjust, arrange or proportion your plane so that it climbs continually, it will still spiral, but to a lesser degree and in an *upward direction instead of down.*

Now we are ready for the next test. With the plane arranged as in Fig. 3, the fuselage and fin is the same as in Fig. 2. The wide area forward of the CLA is the same as in Fig. 2, so the relationship between fin area and vertical area beneath the wing is not changed: in other words, we do not move the CLA *forward* or *backward.* In Fig. 3, the CLA is merely moved down because the whole side area of the pylon and wing is dropped relative to thrust line with only part of it above the fuselage. The remainder is below the fuselage. Note that the CLA relative to CG is considerably lower. Test fly this plane carefully following the same routine as in the first case so that its reactions can be accurately noted under similar conditions. You will find that this plane has less tendency to be *displaced* laterally and directionally, that is about its longitudinal and vertical axes. Rotation about these two axes simultaneously results in a spiral flight. If, in addition, it also rotates about the lateral axis which is parallel to the wingspan, the flight will result in a spiraling dive. On the whole this plane should be steadier in flight showing less tendency to bank and to turn sharply. To make spiral instability more *apparent* in all your tests, turn the rudder slightly for a left hand circle.

Now we come to our third series of tests. Change your plane so the side areas are arranged as in Fig. 4. The fore and aft position of the CLA is the same as in previous tests, but it has been lowered still further because the side area of the wing and pylon has been lowered. The wing now rests directly on top of the fuselage at the indicated angle of incidence, 3°. The side area of the pylon in Fig. 2 now extends below the fuselage in the form of a vertical fin. In case 3 the CLA is below the CG instead of above it. Make sure the stabilizer and wing are properly set to provide the proper trim desired for each flight.

Speaking from our own experience during hundreds of test flights, we believe that this airplane will be one of the steadiest flyers you ever launched. It will make wide turns, with little banking under the effect of wind gusts. There will probably be only slight rotation about any axis. If any movement takes place the whole airplane will *move as a unit* without changing its horizontal attitude to a marked degree. Many movies have been taken of this type of airplane during tests and have been carefully studied. They all reveal the same conditions of steadiness and lack of erratic rolling throughout all phases of flight.

"Design Forum" will be particularly interested in the results you obtain from the tests suggested here.

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In the past, this department has requested that readers send in their favorite designs for analysis. Now we are going to reverse the process. "Design Forum" is presenting here a design of a three place utility airplane for *your* analysis. Study this plan carefully and tell us what you like or dislike about it. In this way your mind will be alerted to important factors to consider in the design of planes. In a subsequent issue we will publish some of the best analyses of this plane. Let us know whether or not you prefer this to other design arrangements.

The general design is shown in Fig. 5 and consists of a central pod-shaped fuselage with pilot seated forward and two passengers immediately behind. A door in the side of the fuselage provides access to the cabin. The engine is mounted at the upper rear part of the fuselage driving a propeller mounted directly on its shaft. Within the fuselage below the wing is a compartment for baggage; gasoline tanks are also located here. The wings are placed approximately on a line with the top of the heads of the passengers. They are supported by two V struts extending from the lower part of the body upward to a point on the wing approximately 5 ft. from the fuselage center. At these points, one on each side of the fuselage, booms are attached to the wing and extend rearward to support the stabilizer and twin fins with rudders.

The ship is equipped with a 3 wheel landing gear. The wings with the struts are so fastened to the fuselage that they are quickly detachable and may be lifted with the booms and tail free of the body by releasing special fittings that hold the wings and struts in place. This requires about 10 minutes. This allows the fuselage to be used as a car for local highway travel to and from the airport.

A shaft drive will run from the motor to the rear wheels, and the prop will have a special release mechanism which allows it to remain motionless while the engine is used for highway travel. If desired, the car may be propelled by the engine driven prop. In such case guards may be attached quickly to the fuselage. These will extend in an arc around the sides and rearward of the propeller. The front wheel is steerable when on the road. The fuselage is composed of a plywood shell into which sets a metal frame that carries the major stresses.

The wings have metal spars and ribs and are cloth covered. They are equipped with high lift full span flaps and a special type spoiler aileron that allows complete lateral control. The two rearward extending booms supporting the tail are of sheet dural with internal bulkheads and longitudinal strip bracing. The tail surfaces are of dural, cloth covered. The wing struts are streamlined steel tubing.

GENERAL SPECIFICATIONS

Wingspan	43 ft.
Wing chord	6 ft. 4 in.
Total area	260 sq. ft.
Engine	150 horsepower
Stabilizer area	25% of wing area
Fin area	8% of wing area
Total weight fully loaded	2500 lbs.
Maximum lift coefficient of the wing with flaps raised	1.5
Maximum lift coefficient, flaps fully depressed	3.4

Now you can figure the plane's general performance. Try this on your slide rule and let us have your conclusions concerning any phase of this plane: structural, aerodynamic, arrangement, convenience, probable cost, eye appeal, etc. Send to: "Design Forum" MODEL AIRPLANE NEWS, 551 Fifth Ave., New York 17, N.Y.

Beechcraft MODEL 17

PREFABRICATED—For engines of .099 to .49 displ., glow plug, ignition or diesel. Wingspan 24", length 21". This kit is 100% complete including a finished balsa fuselage, carved inside and out; finished aluminum cowling ready to attach; leading and trailing edges, shaped and notched.

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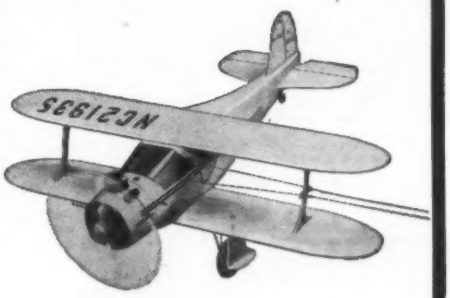

CO_2 Squirt

The Squirt was designed especially for use with CO_2 engines similar to the O K Herkimer and Campus A100. The model is easily built from the complete kit which contains die-cut parts, flywheel, 3-bladed metal propeller, propeller shaft and housing with rubber tubing universal joint. All necessary hardware including motor mounting bolts and propeller nuts. The Squirt measures 12½" long with a 4" beam. Ask your dealer for this newest Scientific kit.

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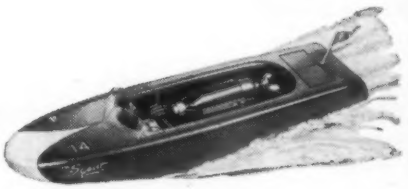

Buckeye

Class "E" length 17", beam 5⅛", weight 2 lbs. for engines of .099 to .49 displ. Kit contains carved hull, cast metal propeller, shaft and housing, hardware, decals, etc.

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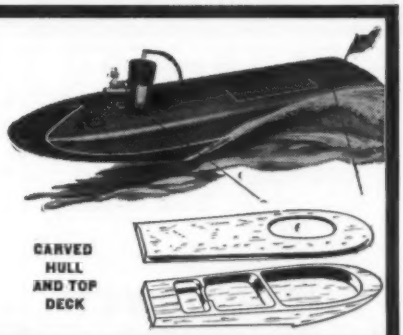

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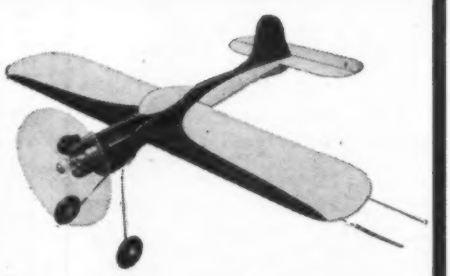

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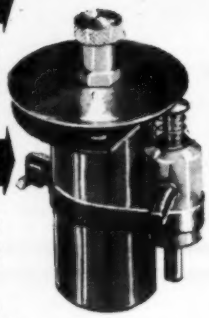

Illustration shows Timer with Stutter-Off

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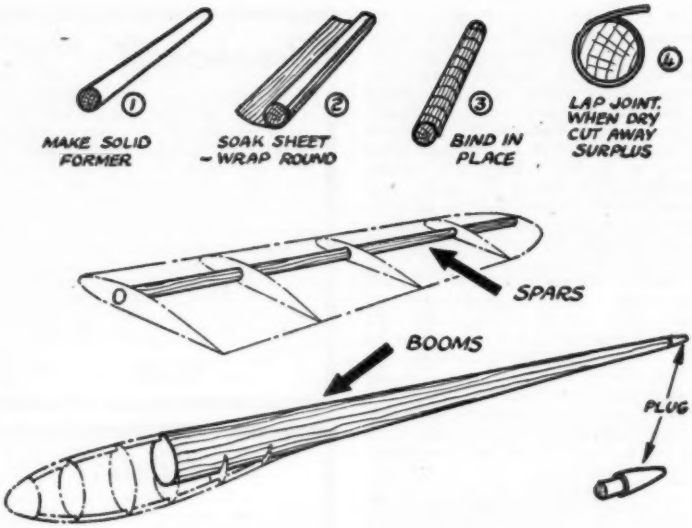

HOW ABOUT BALSA TUBES?

by BILL DEAN

HAVE you thought of using balsa tubes for that new model? Their strength/weight ratio is amazing, and for all components in which lightness and anti-twist properties are essential, they are ideal for many model purposes.

Good quality, even grained, medium balsa is essential. First make a solid wooden former of the inside diameter of the tube in question. Soak the sheet in water, then wrap around the former and bind in place either with rubber or thread. When dry, cement the edges together, using a lap joint and bind up again. Finally, trim off surplus when dry, give a coat of banana oil, and sand down smooth. For real strength, cover the tube with Silkspan doped or cemented on. Lastly, remove former.

These tubes can be used for many model components. Wing spars are an obvious choice using 1/32" or 1/16" sheet—or fuselage and motor booms from 1/16" sheet as required.

Scrap Box

(*Continued from page 3*)

ing to hand start a *McCoy 60*. I fly for fun. It's just a hobby I stay goofy about to keep from going nuts in general. Never set a record and always about six months behind somebody. I have got a kick out of working on glowplug engines."

What first caused DeGinder to glow was a *McCoy Sportsman Jr.* He had substituted the bearings and shaft from a 29 and was surprised by the way the engine roared on a plain gasoline mixture. In trying other fuels, he discovered that methanol ignited too quickly and loosened the prop on every pop. Then he found that methanol worked quite well in an *Ohlsson 23*, and thus arrived at the interesting conclusion that flashpoint and compression ratio are critical factors in glow operation. Then DeGinder constructed a test-balance similar to the one described by Fred Youngren in April M.A.N. and, during a five week period, ran a *McCoy 39* with ball bearings, a *McCoy 60*, *Ohlsson 23*, and *DeLong 30*, as well as a converted *Drone* on various fuels from nitromethane base to kerosene. In presenting the following summary of DeGinder's findings we wish to remind the reader that all such information is the work of one individual and not necessarily gospel. Nor should it be construed as a comparison between engines, due to the many variables. It is offered, with the good doc's permission and with the hope that it will add to the general knowledge.

(Maximum rpm figures were determined with a Vibra-Tac. The *McCoy 39* was converted with a ball-bearing face plate, and the *Drone* converted to glow-plug operation.)

Engine	Compr. Ratio	Fuel	Prop.	Max. R.P.M.	Torque
Ohlsson 23...	6:1	A	9-6	8,200	
		B	9-6	7,500	
		C	9-6	5,000	
		D	No start		
McCoy 60 ...	8:1	A	No start		
		B	No start		
		C	9-10	10,000	
		D	9-10	14,600	4.6 ft. lb.
		E	9-10	12,800	
McCoy 39 ...	9:1	A	No start		
		B	No start		
		C	9-9	9,500	
		D	9-9	11,000	2.3 ft. lb.
		E	9-9	14,000	2.8 ft. lb.
		F	9-9	8,000	
DeLong 30...	10:1	A	No start		
		B	No start		
		C	Poor		
		D	9-8	6,500	
		E	9-8	9,800	1.4 ft. lb.
		F	9-8	7,200	1.0 ft. lb.
Drone	18:1	C	No start		
		D	10-6	5,000	
		E	10-6	6,700	
		F	10-6	8,100	

A—Nitromethane 1, Methanol 2, Castor Oil 2
B—Methanol 3, Castor Oil 2
C—n-Propanol 3, Castor Oil 2
D—n-Propanol 1, White Gas 3, 70W Petroleum Oil 1
E—White Gas 4, 70W Petroleum Oil 1
F—White Gas 1, Kerosene 3, 70W Petroleum Oil 1

* * *

Wakefield builders will be interested in the results of the final eliminations held to select the British team. On May 2, 100 semi-finalists were selected from 11 areas of Great Britain and these in turn were narrowed down to the 6 man team in a

(*Turn to page 42*)

Fellas! HERE ARE THE PROPS that were used by the NATIONALS' WINNERS

CARL GOLDBERG

Yes fellas, it's good to know that all we said about our Props being championship "fans" has proved out in the toughest competition . . . the 1948 Nationals! Not only were these props the choice of those "in the know" but by long odds they outnumbered all the other Props being used! Yes . . . a standard ready-to-fly 35c Prop! Now you know the answers when you want championship Props for either Speed and Power or for Sport and Stunt flying. Go to your dealer and insist on Power Props or Top Flites in the size and pitch you need and pay no more than 35c.

Power Props

Dia.	PITCH
7	*6 **8—9—10½
8	**6 —8—9—10½
9	6 —8—9—10½—12
10	6 —8—9—10½—12
11	6 —8—9—10½—12

*Special CO-2 prop.
**Drilled for Arden .099.

ANY SIZE
ANY PITCH
LACQUERED
AND
BALANCED

35¢

Top Flites

Dia.	PITCH
8	*3½ **6—8—10
9	3½ —6—8—10—12
10	3½ —6—8—10—12
11	4 —6—8—10—12
12	5 —8
13	5½
14	6

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12 First Places at the Nationals!

(INCOMPLETE LISTING)

Novelty Stunt—1st Davey Slagle, Calif., 2 Pterodactyls, Atwood Champs, 11-8 Top Flites
A. Speed Open—1st Harold de Bolt, Williamsville, N.Y., Speedwagon 30, Bantam, 6½-9 Power Prop
B. Free Flight Senior—1st Jack Norris, Lakewood, Ohio, Original, De Long, 10-6 Top Flite
A. Free Flight Senior—1st Jack Norris, Lakewood, Ohio, Original, Arden 19, 9-8 Power Prop
C02 Senior—1st Erwin Rodensky, Detroit, Mich., Powerhouse, Herkimer C02, 6½-9 Power Prop
Payload Event—1st Herbert Kothe, Omaha, Nebr., Original, Torpedo 29, 11-4 Top Flite
B. Speed Junior—1st Elwyn Hill, Kansas City, Mo., Speedwagon 30, McCoy 29, 7-9 Power Prop
A. Precision Stunt Senior—1st Bob Arnett, Hoisington, Kansas, Custom Sportsman, Arden 19, 8-6 Power Prop
B. Precision Stunt Senior—1st Bob Arnett, Hoisington, Kansas, Custom Sportsman, McCoy 29, 9-6 Power Prop
C. Free Flight Senior—1st William Burgess, Muncie, Ind., Westerner, McCoy 49, 11-8 Top Flite
D. Free Flight Senior—1st Dave Reber, Muncie, Ind., Sailplane, Atwood Champ, 12-8 Top Flite
D. Free Flight Junior—1st Vernon Webber, Houston, Texas, Playboy, Super Cyclone, 13-5½ Top Flite

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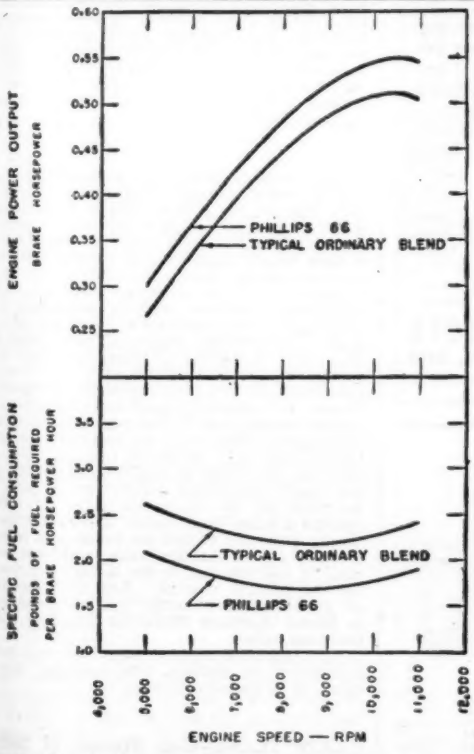

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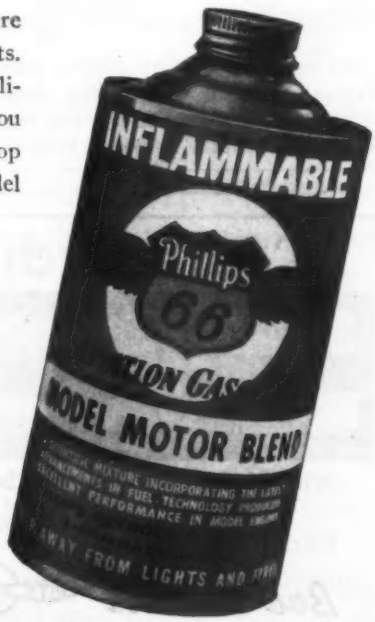

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F6F	"HELLCAT"	23 FINISHED PARTS, CARVED FUSELAGE	2.75
F8F	"BEARCAT"	15 FINISHED PARTS, FOLDING WINGS	2.75

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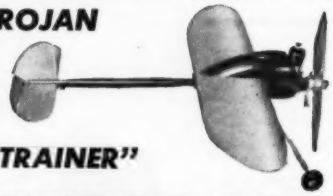

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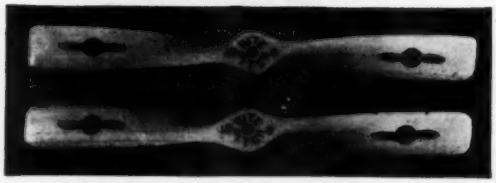

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Supreme Performance in Stunt Flying
GREATER PULL for GREATER MANEUVERS

8"-8"	50c List	10"-8"	50c List
9"-8"	50c List	11"-8"	50c List
12"-8"	60c		

To win contests insist on "RITE-PITCH" World's Finest Gas Model Propellers and Model Gas Tanks.

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contest held just outside London on June 6. Despite wind and rain, the generally good times indicate the high caliber of British competition. The final team, with total times, follows:

R. B. Chesterton	465.25
A. D. Piggot	450
R. Copland	418
(Lost on second flight)	
M. J. King	369
S. Doughty	368.25
L. Stott	351.25

Regarded as a certain place man, Ron Warring, noted British builder, designer and author lost his ship on the first flight, as did Dennis Lees who came over for the last pre-war Wakefield. Copland and Stott also were on the 1939 team. Chesterton and Piggot are well known contestants, leaving only Doughty and King as less seasoned newcomers. Evidently it would take an 8 minute total, or almost 3 minutes average, to beat these chaps in wind and rain!

* *

Out of curiosity we asked the Kidde Mfg. Co. a few questions about their *Soda King Super-Charger* used for CO2 engines. Always a sucker for guessing how many jelly beans are in a jug, we had to know how much space would be filled with the escaping gas from a pierced cartridge. Kidde says .3 oz. of carbon dioxide charge increases in volume 417 times to 267 cu. in. at atmospheric pressure. If air were used instead of carbon dioxide, the volume of free gas obtained would be only eight times that of the cartridge. Air and most other gases cannot be liquefied in the cylinder at the temperature and pressure used in the *Soda King*. With an internal volume of .64 cu. in. the .3 oz. of CO2 in the cartridge is under a pressure of 1,200 p.s.i. Minimum wall thickness is .035. Asked about the possibility of bigger cartridges, the Kidde Co. explains that such capsules could be made but at an equivalent price many millions would have to be sold to justify the investment in special machinery. Since it is difficult to tell at what pressure the cylinder will exceed its strength, Kidde warns that heating of the cartridge is a highly dangerous thing to do. (Remember the AMA contest rule—cartridges shall not be heated greater than body temperature.)

* *

How things have changed in model building is nowhere more emphasized than in our attitude on prizes. Many a builder won't go to a contest if he knows the prize list isn't long and fully packed. There was a time when sponsors put on contests to help modeling and, through modeling, American aviation. Now we have many a fair weather sponsor selfishly interested in nothing but the publicity he gets out of a meet. The modeler is nothing but a means to an end in the eye of many sponsors. It wasn't always this commercial. At a recent meet we ran into Joe Dale, Rockville Center, L.I. who recounted one of his early contest experiences. This was back in 1912—or was it 1910?—and the contest was at Huntington, L.I. Someone had the bright idea (for the time) of soliciting prizes from the local merchants. Joe won a place. Stepping up to claim his prize he was handed a large layer cake. That night the family gathered to see the prize, and incidentally eat it, but the cake could not be cut. It had reposed in the bakery window for the past 12 months! And that should be good for the monthly free subscription to MODEL AIRPLANE NEWS for the best tall but true tale.

. . . And let's hope we don't become too dependent on fellows who someday may hand us a rock-hard cake.

* *

LATE FLASH—Glen Tempte, at Twin City Plymouth Dealer's Model Airplane Meet, (Rosemount, Minn. July 11) hit 179.03 mph using *Dyna-Jet Red Head* in an original design speed ship. Record has been certified by AMA.

Facts on Fuel

(*Continued from page 23*)

require considerable experimentation to obtain consistent results. Approximately 3/4 c.c. of tetra-ethyl lead per quart of engine fuel is advantageous, and because tetra-ethyl lead is the most effective detonation suppressant, a greater quantity per quart of engine fuel is required of other anti-knock fuel components; the exact quantity can be determined by experiment.

ALCOHOL AS A FUEL—Pure ethyl-alcohol, while presenting many attractive operational characteristics, may not always prove entirely satisfactory for all around general use. The prospects of use of certain alcohol fuel mixtures and blends are desirable, however, because the high volatility assists in quick engine starting. Alcohol is non-corrosive and has high resistance to detonation or pre-ignition. However, for equal power output more alcohol will be required than gasoline, i.e. 3 oz. of alcohol will not produce as much power as 3 oz. of gasoline because of the variation in the calorific value.

A mixture of alcohol and benzine was tried by the author, mixed in a 3 to 1 ratio. Although benzine exhibits a high resistance to detonation, it is not desirable to use if quick starting is necessary. A suitable alcohol fuel mixture can be made from the following:

Ethyl-alcohol	86 c.c.
Ethyl ether	10 c.c.
Wood spirit	1 c.c.
Benzine	3 c.c.

This makes a fuel quantity of approximately 3-1/2 oz.

Another alcohol base engine fuel which has been used and which seems to have possibilities is:

Ethyl alcohol	96-1/4 c.c.
Wood spirit	3/4 c.c.
Acetone	1/4 c.c.
Benzine	2 c.c.

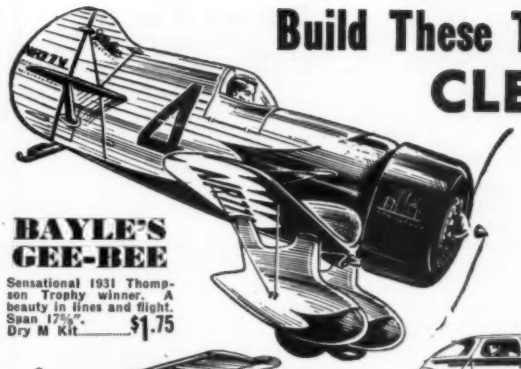
This quantity of fuel ingredients makes approximately 3-1/2 oz. The benzine functions as an anti-knock component and the acetone assists in quick starting.

The air ratio for alcohol fuel ranges from 7.5 to 8.5 as a general rule. This indicates that a coarse setting of the needle valve may be used; but to obtain a suitable setting in that range requires an accurate adjustment. Alcohol when compared to gasoline contains 1/2 to 2/3 the heat units of high grade gasoline, and therefore a proportionate drop in the engine output is obvious. Straight run gasoline contains from 18,000 to 21,000 B.T.U. per pound, whereas alcohol ranges from 10,000 to 13,000 B.T.U. per pound.

TETRA-ETHYL LEAD COMPARISON—As was stated previously, tetra-ethyl lead as an anti-knock fuel component is the best on a basis of fuel weight. To eliminate detonation in one quart of engine fuel it will require:

(1) Tetra-ethyl lead	0.75 c.c. or
(2) Aniline	34.50 c.c. or
(3) Ethyl-iodide	53.40 c.c. or
(4) Ethyl alcohol	163.80 c.c. or
(5) Benzine	339.1 c.c.

INTAKE FUEL VELOCITY — Intake fuel velocity is a function of the air ram pressure imposed on the fuel and the volatility of the fuel charge. In some engine installations, advantage is made of the dynamic ram air pressure imposing upon the fuel, thus tending to increase the ejection of raw fuel into the carburetion chamber past the needle valve. Any reasonable increase in the dynamic air ram



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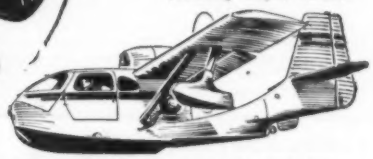

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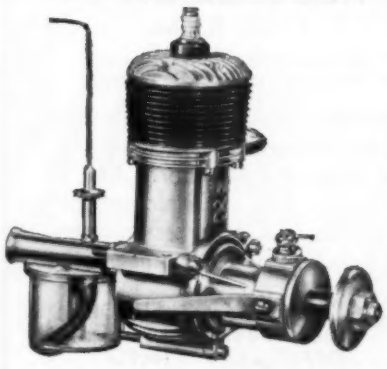

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pressure will be effective because the turbulence of the fuel charge will be proportionately increased. Turbulence in the fuel charge assists in the attainment of a complete mixture of fuel and air. In short, more turbulence means better combustibility. At high engine rpm a moderate rate of fuel induction will tend to slow flame propagation because the ignition spark will then fire into the fuel charge instead of vice versa.

ENGINE COOLING—Fuels which have a high rate of vaporization also perform another function in engine cooling by absorption of the heat of combustion. The instantaneous high rate of vaporization, therefore, is an asset to consider where an engine is used which has a minimum of fin area but from which a high power output is anticipated. The use of these fuels is desirable when an engine is being run at open throttle for extended periods of time on the ground to check engine or propeller operations. Alcohol, methanol, or ether base fuels fall into this category.

COMPRESSION IGNITION ENGINE FUELS—Fuels for operation of compression-ignition engines are nitrated ether hot fuels and are mixed with castor oil to obtain maximum power and satisfactory lubrication. These fuels are volatile, and the range of compression of compression-ignition engines, being variable, permits the use of various kind of fuel mixes such as these.

EFFECT OF HUMIDITY—High humidity militates against the use of an engine fuel which exhibits only moderate vaporization characteristics. Where excessive humidity and temperature prevail, the use of a chemically acclimatized fuel is necessary if maximum engine power is to be developed. High humidity and high temperature are usually present together, and as such require that a volatile fuel be used as a compromise because of the inherent reduction in the volumetric efficiency of the fuel charge which is caused by the low density air. On the other hand, moderate temperature accompanied by a foggy atmosphere actually tends to improve engine performance. This is probably caused by the water content present in the inducted air, which when mixed with fuel liberates additional oxygen. This additional oxygen has the same effect as the enrichment of the fuel charge, and as a result the engine runs closer to maximum power output than on a warm day, and at a considerably lower head temperature.

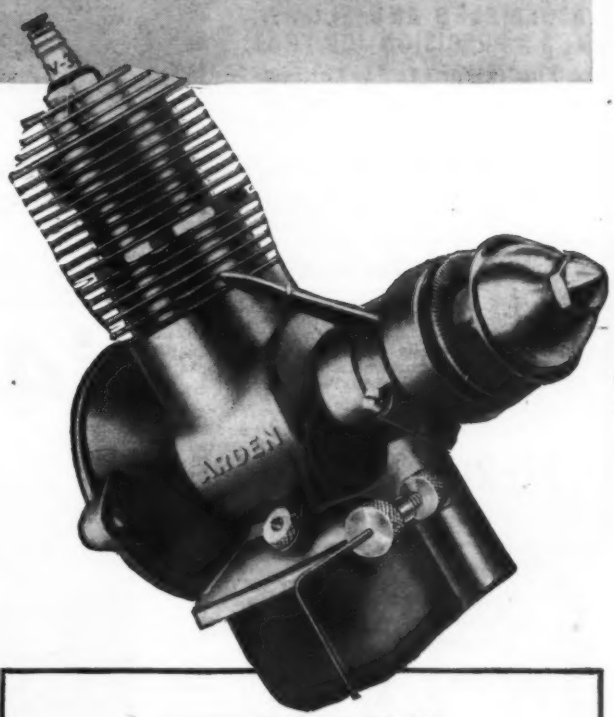
ALTITUDE AND FUEL MIXTURE—Where gas engines are to be operated at high altitudes above sea level, a proportionate decrease in the rated engine performance is caused by the inherent reduction in the air density. For example, at 10,000 ft. altitude, air has only 75% the density of sea level air. Therefore, the higher the altitude the more air which must be inducted to atomize a specific quantity of fuel, or the fuel mixture must be leaned to coordinate with the density of air at the specific altitude. This holds true whether alcohol or gasoline is used as fuel.

OIL DRAG—Model gas engines are partially lubricated by the fuel, and, of course by the oil which is mixed with the fuel for the specific purpose of reducing internal friction of the reciprocating parts. The oil is mixed with the fuel in a ratio of 1 to 3 for normal flights, and 1 to 4 for racing engine performance. S.A.E. 50 to 70 viscosity oil is suitable for lubricating purposes.

The property of oiliness in a lubricant is important in any engine which runs

Again it's ARDEN

. . . with a new and improved ARDEN GLOW PLUG designed to permit replacement or interchanging of HOT and COLD ELEMENTS



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1. **YOU CAN NOW EXPERIMENT** with your engine and determine which of the two elements will insure its greatest operating efficiency.

2. **ONE IMPROVED GLOW PLUG DOES THE TRICK,** as elements are both interchangeable and replaceable.

3. **DRASTIC SAVINGS IN EXPENSE,** as 2 replacement elements can be purchased for the price of one Glow Plug . . . actually a replacement cost of only 42½c each.

85¢ FOR 2 REPLACEMENT ELEMENTS

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1-P-099	.099 engine with plain bearing crankshaft	$12.50
1-B-099	.099 engine with ball bearing crankshaft	15.50
1-B-199	.199 engine with ball bearing crankshaft	18.50

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E-8030 SH	Improved Arden Glow Plug (short)	85c
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E-8035	Replaceable glow plug element (hot), 2 for	85c
E-8037	Replaceable glow plug element (cold), 2 for	85c
8015	Arden Glow Plug Adapter	25c
A-1350	Engine Exhaust Stacks for .099 engine	35c
B-2350	Engine Exhaust Stacks for .199 engine	45c
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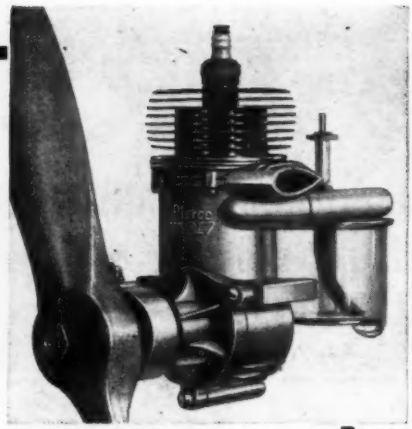

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at 5000 rpm or more. The film of oil existing between piston and cylinder wall is very thin. The pistons on many engines do not have rings, and because of this the viscosity may not be of primary importance, but the oiliness may be of major importance in obtaining high performance. The oiliness of a lubricant is defined as the characteristic of the oil to spread over the surfaces in contact. Oiliness in a fuel-lubricant mixture controls the degree of friction of the reciprocating parts and also absorbs limited heat. A difference in the engine rpm is noticeable when lubricants of the same viscosity but different degree of oiliness are used in the same engine at the same temperature and pressure of the oil film. Oil which has excessive drag will absorb considerable power.

GLOW PLUG ENGINES—Glow plugs may be used in place of conventional spark plugs on spark-ignition engines. Ether base fuel nitrated with chemicals are suitable for glow plug engines.

Four Digit Family

(*Continued from page* 16)

page. On a large sheet of stiff paper, mark out an accurate 15"x15" square and cement the L's in the corners as indicated in the small sketch at lower left of page 15. The lines on the L's are extended with a ruler and pencil to complete the locator template.

We are now ready to draw a sample airfoil. A sheet of ruled notebook paper is handy for this job. If the chord line is drawn parallel to the long edge, the blue ruled lines help to keep vertical lines exactly vertical. Don't rush your first production; follow the text and the step-by-step pictures carefully. When the system becomes familiar, an airfoil can be turned out in fifteen minutes, but take your time on the first one.

For an example, we will draw a 6409 with a 12" chord. If you're worried about the math we'll get it out of the way right now. The first number of the airfoil's name is multiplied by the chord length to give the "backbone number". 6x12=72. The second number determines the distance from leading edge to the point of maximum backbone height. 4/10x12"= 4.8". The last two numbers times the chord gives the "teardrop number". 09x 12=108.

Step 1: Lay off a chord line 12" long and locate the point of maximum backbone height 4.8" back of the leading edge. Number this station 6.

Step 2: Locate the backbone stations on each side of station 6 using the backbone station locator. Turn the large template you glued together so that the words "Backbone Station Locator" read right side up. Locate the rear stations 7, 8, and 9 first. Keeping station 6 on the extreme left edge of the template, slide the paper on which the chord line is drawn down the locator until the trailing edge station just intersects the dotted line on the locator at the edge of the paper. The illustration of step 2 should make this clear. Station 9 is shown being ruled in.

Stations 1, 2, 3, 4 and 5 (in front of station 6) are located with the same template. Shift the paper so the leading edge station coincides with the extreme left edge of the locator and station 6 hits the dotted line. Rule each station in its correct position and number clearly.

Step 3: Turn the small template so that the words "Backbone Heights" read right side up. Find the backbone number 72 on

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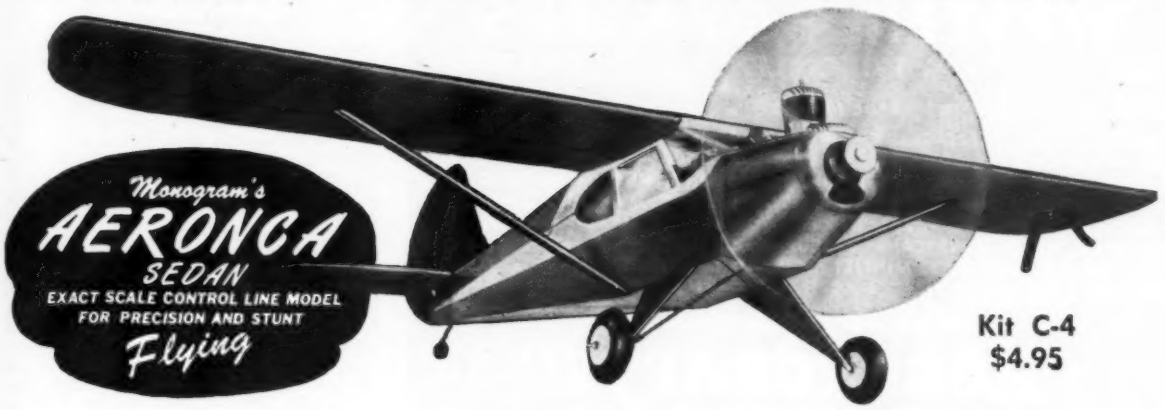

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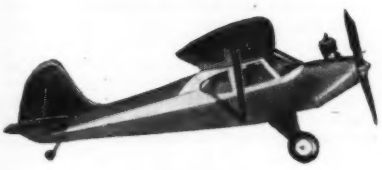

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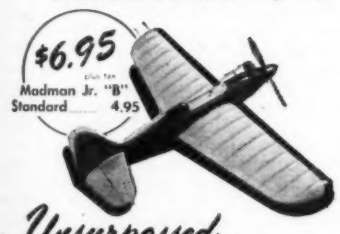

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the scale below the template and draw a vertical line from 72 up through all the heights. Check the photo of Step 3.

Measure each backbone height at this pencil line and transfer the measurement to the corresponding station. Note that height 3 is the same as 9, 4 is the same as 8, and 5 is the same as 7. The illustration shows height 5 and 7 being measured and marked.

Step 4: Push pins into the leading edge, trailing edge, and the nine points just determined. Connect the points with a smooth curve by drawing along a thin balsa strip.

Now the backbone stations are no longer needed; erase them so they won't be confused with the teardrop stations which are drawn next.

Step 5: Invert both templates and use the parts which were formerly upside-down. Locate the teardrop stations with the teardrop station locator. All of them, A to I, are located in one operation as shown in the photo of Step 5.

Step 6: Rule off the template of teardrop thicknesses at the proper teardrop number, 108, and mark off the thicknesses above and below the backbone at the corresponding stations. The thickness is the same at A and I, at B and H, and at C and G. The measurement being taken from the template in photo 6 will be used four times: above the backbone at F (shown), below the backbone at F, above the backbone at D, and below the backbone at D.

Step 7: Complete the foil by drawing the curves of the upper and lower surfaces.

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World War I

(*Continued from page 27*)

craft.

In 1912 the British Army held a military airplane competition in which all leading British and foreign manufacturers took part. During this competition de Havilland flew the B. E. 2 as it had never been flown before; and though he did not win officially, other contestants conceded that he put up the best showing in the field.

An observer at these competitive trials was a man who later figured very prominently in British aviation circles—George Holt Thomas, a publisher. At that time he had the agency for the French Farman line in England—and had sold several of the craft to the British Army. Shortly after the competition mentioned above, Thomas organized the Aircraft Manufacturing Co. Ltd. at what is now Hendon Aerodrome. As chief designer of his new company, generally known as Airco, Thomas chose de Havilland because of his unusual ability as an engineer and pilot. It was in this organization that the famous series of D.H. airplanes was originated—a series that was to be consecutive through two world wars.

The D. H. 1

Geoffrey de Havilland had been with Airco only a few months when World War I began. He was already busy at work on the design of a new two-seater pusher, as so many others were, that would solve the big problem of the day—carry a machine gun effectively. "Effectively" in this case meant high, fast, over a long distance, and in such a manner that the gun could be used with good result.

The new aircraft, the D. H. 1, made its first flight early in 1915. As simple as they were in those days, aircraft could be designed, built and test flown in a matter of just a few months. The D. H. 1 was an immediate success. Its performance with a 70 hp Renault V-type air-cooled engine was unusually good. Its top speed at sea level was just 78 mph, and its rate of climb, because actual data is not available, is estimated at something below 500 fpm.

De Havilland himself did all the preliminary flight testing on the D. H. 1. The lessons he had learned in the application of inherent stability theories to full sized aircraft while at the government factory were incorporated in the new pusher. He demonstrated these qualities very impressively by continually flying the D. H. 1 "hands off" during tests, even at low altitudes.

But as excellent an airplane as it was, the D. H. 1 was in competition with the government-designed F. E. 2; and when it came to production orders the latter aircraft was the one selected. Admittedly this was probably a good choice, because as it turned out the F. E. 2 was a little more rugged than the D. H. 1 and in addition contained a number of parts interchangeable with other R. A. F. designs.

D. H. 1 Construction

In configuration, the D. H. 1 was a two-bay pusher biplane with the empennage attached by means of outriggers. Its overall length was 29 ft. and wingspan was 40 ft. Both upper and lower wings were set at 5 1/2 deg. incidence and 3 deg. dihedral. There was no stagger or sweepback. Chord of both wings was 5 ft. 9 in. and total area of 362.25 sq. ft. was divided between 187 sq. ft. in the upper and 175.25 in the lower wing.

Structurally, both wings were almost identical and the outer panels were interchangeable between upper and lower planes. Outer panels were built up of the usual two wood spars with rib webs fore, aft and in between. The plywood webs were held in place by thin wood capstrips which attached to the leading and trailing edges at their extremities. Outer panels contained 12 ribs, including the butt rib where they were attached to the upper and lower center sections. Non-balanced ailerons were fitted to each outer panel and were hinged directly to the rear spar. The usual internal compression members and wiring were employed.

Upper and lower outer panels attached to respective centersections. The upper centersection was one piece and flat. It was attached to the body, or nacelle which carried the engine and crew, by four vertical struts braced with wire. The lower centersection also was without dihedral but made in two pieces—right and left—which attached to the nacelle near the lower longeron. Upper and lower centersections were separated by the inboard interplane struts. The tail supporting outriggers were attached to the centersection assembly by fittings at the points of attachment of the rear inboard interplane struts and the two centersections. The trailing edges of both centersections were cut away slightly to permit propeller clearance and accessibility to the engine.

An innovation tried in the D. H. 1 but eliminated in later modifications was a manually controlled air brake. This brake was in the form of two monoplane wings, each about 3 ft. in span mounted on the top longeron of the nacelle on each side, and just forward of the engine. Normally these brakes were set at zero incidence, but on landing the pilot could rotate them until they were flat against the wind. The drag thus created and assumed structural difficulties involved apparently cancelled one another for the purpose and the brakes were removed.

The nacelle contained individual cockpits for the two crew members forward and the engine aft. It was framed of wood longerons and uprights with fabric laced to the sides. The streamlined nose and cockpit coaming—the latter with cutouts for the observer in the nose and the pilot just forward of the wing leading edge—were made of sheet aluminum. Visibility, as was common with all pushers of its type, was excellent in the D. H. 1. Although not fitted to the original machine, the D. H. 1 design provided for a single post-mounted Lewis machine gun in the observer's position.

Landing gear of the D. H. 1 was a conventional two-wheeled affair consisting of wood struts braced with wire. The gear incorporated a novel and somewhat advanced shock-absorbing arrangement. Landing loads were taken by coil springs while the rebound was dampened by a piston working in a cylinder of oil. The intention, of course, was to provide a landing gear with good shock absorbing qualities but without the bounce associated with undampened systems. The arrangement was particularly good for rough field operations and made the D. H. 1 "stick" once it was put down.

Ground tail loads were supported by a simple rubber-sprung skid hinged to the bottom of the apex formed by the lower outriggers at the tail. A large skid mounted on the underside of each outer wing panel beneath the interplane struts completed the landing equipment.

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1/16x3/8	2½c	1/4x5/8	7c	1/16x2	8c
1/16x1/2	3c	1/4x3/4	8c	1/8x2	10c
3/32 sq. 3 for	8c	3/8 sq.	6c	5/32x2	12c
3/32x3/16	2c	3/8x1/2	8c	3/16x2	14c
3/32x1/4	2½c	1/2 sq.	9c	1/4x2	16c
3/32x3/8	3c	3/4 sq.	15c	5/16x2	18c
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1/8x1/2	4c	2x2	.60	3/32x3	15c
5/32 sq.	1½c	2x4	1.20	1/8x3	19c
3/16 sq.	2c	2x6	1.80	3/16x3	22c
3/16x1/4	3c	3x3	1.50	1/4x3	25c
3/16x3/8	4c	3x6	2.70	3/8x3	30c
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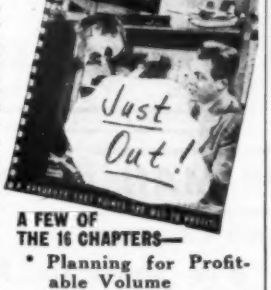

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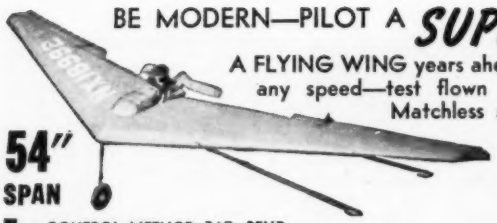

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Empennage consisted of a conventional horizontal stabilizer, elevator, and a balanced rudder, with a small horizontal fin. The stabilizer was made in one piece and was bolted to the upper outriggers, or booms. The elevator, also constructed as a single unit, was divided in the center from its trailing edge to its main spar to give clearance for rudder swing.

A vertical stabilizer, or fin, with a much greater chord than span, was bolted on top of the stabilizer. The rudder was well rounded, with its balancing portion located between the vertical separation of the upper and lower booms.

Although the D. H. 1 in its original form never was produced in quantity, it was a very good airplane both structurally and performancewise. The previously quoted top speed of 78 mph on 70 hp was at a gross weight of 2044 lbs. Wing loading was about 5 lbs./sq./ft. and power loading 22 lbs./hp.

With a good airplane on their hands but no orders Airco decided to develop the basic D. H. 1 into a more serviceable military design. De Havilland returned to his drawing board once again, made some changes in the D. H. 1 and came up with the D. H. 1A. This new ship, which reached the production stage and did see active service, will be analyzed next month.

Model Monocoupe

(*Continued from page* 11)

assembled control surfaces joined to the stabilizer with the conventional crenoline hinges. The control wire is formed and joined to the control horn as shown on plans. Check for any binding that might occur.

Wing ribs are cut from 1/8" and 1/16" sheet as specified, and lightening holes cut by means of a bow pencil or compasses into which a small piece broken from a razor blade is inserted. Pin the 1/8" x 1/4" hardwood spars in place over the plan and add the ribs, leading and trailing edges, and tips. Two halves are built and joined together by 1/8" plywood reinforcements. Fill in on the wing underside as indicated for struts and braces, and cement the wing securely in place. The 1/8" x 1/4" hardwood wing struts, sanded to streamlined shape, are cemented into the wing and landing gear struts, and the 1/8" dowel braces added. Holes are drilled horizontally through the wing struts at the braces for passage of the control leads.

Install all windows and the windshield, of heavy celluloid, and cover the entire model, both wood and built-up parts, with two crossgrain layers of heavy grade Silkspan. Dope with four coats of clear and color as desired, sanding lightly with 400 finishing paper between coats. If sufficient color dope is applied the model may be rubbed and waxed to a "new car" finish, which will add to both appearance and performance.

PHOTO CREDITS

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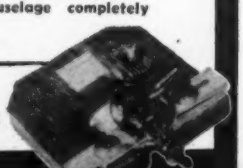

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Flash News

(*Continued from page* 1)

maximum) the plane passed rapidly back through the barrier and glided down to Muroc Air Force Base at about 400 mph. The pilots make their approach at about 250 mph and land at 160 mph, and roll about 2½ miles across the dry lake bed! (They do not usually use their brakes for the simple reason that they are not needed: Muroc Dry Lake is 7 miles long!) Naturally, neither pilot would comment on exactly what happened as the sonic wall was breached but gave a pretty clear indication in the statement that they both would have known they were flying faster than sound even had there been no instruments in the airplane!

MANY OBSERVERS have breathed a sigh of relief now that sonic speed has been exceeded and the point has been proved. However, Dr. Hugh L. Dryden, NACA Director of Aeronautical Research, says that this is only the first step in a long, hard road ahead before a fully supersonic military plane is developed. He points out that the XS-1 is a small, very-strong airplane flown at extremely high altitudes where the air loads are light. The air density at the high altitude of the XS-1 flights is only 1/20th that at sea level resulting in loads on the airplane only being 1/20th those at sea level. If a pilot were to attempt to fly the XS-1 at supersonic speed at sea level, the wings would be subjected to 20 times the load already experienced! In the opinion of Dr. Dryden it will be an entirely different accomplishment to fly at supersonic speed in a combat aircraft near sea level, and that is the goal of the elaborate NACA-Air Force-Navy highspeed piloted flight research program with the XS-1, the Bell XS-2, the Douglas D-558-I *Skystreak* (world's record holder at 650.8 mph since Air Force will not claim speed or altitude records for the XS-1—they'd have to tell just how fast and how high it has gone for that!), and the Douglas D-558-II *Skyrocket*, which most observers believe is the fastest airplane ever built.

HARD ON THE HEELS of the XS-1 announcement comes the news that the North American XF-86 has flown faster than the speed of sound in dives! Although this is far different than supersonic speed in level flight, it is graphic indication that the supersonic age has arrived. The XF-86, which is in quantity production and slated to become our standard Air Force interceptor in the coming year, features wings swept back 30° to ease the effects of shock waves. This action is created by the fact that the air passing over the wing *chordwise* (at right angles to the leading and trailing edges) is flowing more slowly than the air passing over the wing in the direction of flight. This means the airplane as a whole may be flying at supersonic speed while the chordwise airflow over the wing is at subsonic speed! (That sounds paradoxical but, believe it or not, it's true!) Of course this difference between the airplane speed and its wingflow speed is about one-third the speed of the airplane (or about 200 mph), and as soon as the airplane reaches a speed of, say 800 mph at 30,000 ft., then the wingflow itself reaches sonic speed and shock waves form as in the XS-1. Thus, the swept wing has its principal value in the transonic speed region (Mach. number 0.85 to 1.15).

LOOK FOR THE Boeing B-50 to really "reach out" when the B-50C model comes along, for it is reported to be powered by Pratt & Whitney *Wasp Major* "compound" engines. This is a combination reciprocating and gas turbine engine with the best features of both combined. It consists of a standard *Wasp Major* equipped with turbosuperchargers, but the turbine is geared directly back into the engine in such manner that it assists in driving the crankshaft rather than in simply supplying compressed air to the carburetor as in the standard B-50. This extra energy provides either 20% more power or 20% less fuel consumption, either way you want to use it. The B-50C will use it both ways: for assistance in getting heavy loads into

the air on takeoff and for a s-t-r-e-t-c-h-i-n-g the range an additional 20% during the cruise flight.

NO NEWS FROM Russian aviation during the past two or three years has been good news for inside news on their latest aircraft is now available and it's all bad! Contrary to many opinions the Russians have not been idle aviation-wise since V-J Day, and news now available on a flock of new jet aircraft should make the more squeamish of our readers (like this writer) snap up and take notice. Take the new Russian version of the German DFS-346 swept wing fighter, for example. It's said to have flown at supersonic speed over Moscow during the annual May Day celebration. It's a sleek, swept wing design with its stabilizer mounted high atop the fin as in the Curtiss XF15C Navy fighter. Two versions of this are available: one with the air intake located in the extreme nose, and a second with the air intakes located on either side of the fuselage at the wing leading edge (a la Lockheed P-80 *Shooting Star*).

Then there's the MIG fighter, a "soup ladle" design with the pilot and jet engine suspended below the wing, the jet exiting out of the rear of the spoon and the tail supported on a boom running aft. Designed by Artem L. Mikoyan, this speedy craft is powered by a single turbojet engine of unknown make and power and is said to be in quantity production. But it's not just fighters that Uncle Joe has been working on, for there's the Ilyushin four-jet bomber that looks uncomfortably like a neat combination of the Russian built B-29 and the newer Boeing XB-47 bomber. Take a B-29 and sling four jet units on struts beneath the wing a la XB-47 and you have the new Ilyushin.

Not so frightening but nevertheless indicative of progress is the new Tupolev bomber, which is apparently a wartime TU-2 with its propeller-engines replaced by two jet units. These are the planes that were actually photographed over Moscow. In addition, our Air Force has observed other Russian planes over Korea, over Northwestern Alaska and, to a lesser extent, over Eastern Germany including a type that appears to be a distinct copy of our Republic P-84 *Thunderjet* fighter. How many of these new aircraft they have, not even Sec. of Air Force Symington knows, but there's little doubt the Russians are designing and building as quickly as possible. The only thing they respect is a powerful Air Force and, personally, that's also about true of these United States. Whew!

THE RACE FOR the first U.S. jet transport is on—on the drawing board that is! Douglas, Lockheed, Boeing, Martin and Convair are all feverishly detailing new jet transports but none are making any plans for actual construction. Why? No money! None of these companies contemplates actually building a prototype jet transport until the Air Forces or Naval Aviation agrees to foot the bill, for none of them has the $30,000,000 it would require to develop such a plane. A solution for that problem loomed recently in a bill introduced in Congress to set up a special board and appropriate money to the Air Force and Navy to permit construction of a series of transport planes suitable both for the services and the airlines, but in the last-minute Congressional rush last spring it failed to become law, although both houses supported it. Who is actually first may depend on the company in the best financial position coupled with the most courage—at the the moment it looks like Douglas may make the plunge this year! Lockheed has definite plans for a jet version of the monster Constitution Navy transport but this will depend on the Navy; and even the Navy has no money for such a project in the current fiscal year 1949 funds.

CUSTER "CHANNEL WING" has made its first successful test flights at Hagerstown, Md. Readers may recall this design in which the wing has two large circular segments between fuselage and tip in which propellers are located. Idea is that

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the props actually pull the air over the top surface of the channel rather than pull the whole airplane along in order to create a fast airflow over the wing. By making the propeller act more directly, Wilfred R. Custer, its inventor, believes the airplane will be capable of rising vertically since forward motion is not required for the airplane to sustain itself. An earlier piloted version of the design made several successful test flights but with small fixed wing surfaces outboard of the channel section. The new model uses only the channels and more powerful motors.

AL WILLIAMS DOES IT AGAIN! Always first out with the latest, the Gulf Oil Co. veteran stunt pilot now has a Grumman F8F *Bearcat* fighter for his own, all done up in the familiar orange-and-white color scheme identifying his "Gulfhawk" sportsters. The only privately owned *Bearcat* in the world, Al obtained it through the cooperation of Grumman Aircraft and Navy Bureau of Aeronautics. He wants to fly it in the 1948 National Air Races but the Navy has not yet said "yes" due to the fact that they may have their famed "Blue Angels" team of four *Bearcats* on the program. (Also, many observers wonder if the 52 year old Williams isn't still a better stunt pilot than anything the Navy could muster—even in a Navy fighter plane!)

WE CAN FORGET the guided missile—at least for a long while! That's the studied opinion of Sec. Symington and Dr. Lawrence Hafstad, secretary of the Research and Development Board, the latter a scientist who above everyone else ought to know since it is his job to develop them. It's guidance and control at ranges longer than 200 miles that present the unsolvable problems. . . . Any ideas?

Report from the West

(*Continued from page 9*)

son 11:04.7; Sr.—Roy Boone 7:27.12; Open—Dick Berry 13:16.8; Expert—Bob Holland 16:51.7. *"B" Gas.* Jr.—Gordon Reymore 12:00; Sr.—Duane Carpenter 15:28.4; Open—Paul Gilliam 10:35.1; Expert—Pat Regan 18:50.2. *"C" Gas.* Jr.—Daryl Shepherd 3:29; Sr.—Don James 2:16.0; Open—Paul Gilliam 12:39.0; Expert—Al Trainor 12:12.7. *"D" Gas.* Jr.—Daryl Shepherd 11:36.9; Sr.—Jason Hayward 14:01.9; Open—Andy Tagliafico 13:49.7; Expert—Joe Bilgri 12:39.2. *R. O. W. Gas.* Sr.—Dick Rigney 4:48.0; Open—Don Donahue 10:00; Expert—Bob Holland 6:09.6.

CONTROLINE EVENTS. *"A" Speed.* Jr.—Dick Grandel 77:85; Sr.—Dick Rigney 81:81; Open—Ted Pocock 84.90; Expert—Huth & Mathews 104:65. *"B" Speed.* Jr.—Steve Jentges 110:42; Sr.—Dick Rigney 115:38; Open—Acord & Wisniewski 107:14; Expert—Burris & Mahieu 116:12. *"C" Speed.* Jr.—Dick Grandel 113.56; Sr.— Bob Behrens 124.05; Open—Joe Carter 120.80; Expert—Huth & Mathews 133.33. *"D" Speed.* Jr.—Dick Grandel 122.44; Sr.—Parker Hubert 134.32; Open—Lake & Smith 119.20; Expert—Thomas & Wallick 155.17. *Stunt.* Jr.—Jim Milbeck 313; Sr.—Duane Varner 293; Open—Lake & Smith 300; Expert—Jack Gilroy 352. *Sweepstakes Winners.* Jr.—Jack Butler 416; Sr.—Dick Rigney 505; Open—Don Donahue 353. *Special Awards.* Championship Woman Contestant—Mom Robbers 35. Champion Team—Flightmasters 1326.

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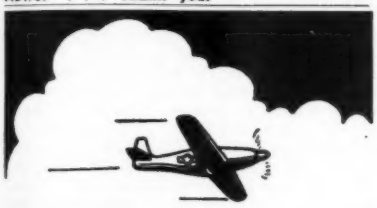

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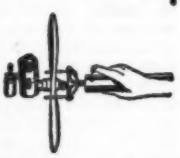

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McDonnell XF-85

(*Continued from page* 19)

product. Briefly, what technical problems had to be solved before the world's first bomber parasite fighter made its first test drop?

First of all, it is obvious that we first had to have the bomber, a craft big enough to house even the tiny dimensions of the McDonnell XF-85. That problem alone, although developed independently as a bomber, has required almost 20 years! For example, the only bomber available at the time of the *Akron* and the *Macon* was the Martin B-10, followed closely by the Boeing B-17, a truly huge airplane in August 1935 when it made its first appearance. But even this giant four-engined craft could hardly house even the smallest airplane in its bomb bay. Even the huge Douglas B-19 could not accommodate a fighter in its belly. It was not until the monster Convair B-36 came into being in the summer of 1946 that it appeared practical to execute this admittedly old idea.

But we had the bomber in design in 1945 when Air Force technicians began a serious study of the possibilities of the parasite fighter and awarded a contract to McDonnell Aircraft Corp. in Oct. 1945. The problem was straightforward and tough: design a high speed fighter capable of being carried in the No. 1 bomb bay of the B-36: a space only 16 ft. long! That set the dimensions of the airplane: its wings would have to fold and it could not be longer than 15 ft. To design a full size airplane capable of carrying a pilot and armament in a length of 15 ft. definitely ruled out the conventional design in which the wing is forward and the tail aft; there simply wasn't that much room. McDonnell approached the problem from the standpoint of a semi-*flying wing* design: that is, the fuselage rested squarely on the wing. Since a true *Flying Wing* would have to have a span of about 50 ft. in order to house a pilot and equipment, McDonnell engineers chose a fuselage design which immediately presented the problem of supplying a tail; and this one feature of the XF-85 project has caused more headaches than all the rest of the airplane combined.

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is needed *provided* there is little or no "lateral area" to the wing (a portion projecting from the wing in silhouette). But with a fuselage having lateral area forward of the C.G. there must be lateral area (tail) after of the C.G. to provide directional stability.

But providing this dorsal or ventral area at the rear of the ship presented a difficult problem for two reasons: (1) the height and depth was restricted inside the bomb bay; (2) the "moment arm" of a horizontal tail was so short as to require an extra-large span, which also was prohibited by the bomb bay dimensions. The result was a "butterfly" or "V" tail (such as is used on Art Chester's *Swee' Pea* racer and the Beech *Bonanza* personal aircraft. In this design, one set of tail surface act as both elevators and rudders, or "rudevators" as they might be called. When they are moved in unison they act as elevators; when moved differentially they perform the function of a rudder. McDonnell topped this butterfly tail off with fin surface atop the tail and additional fin surface under the fuselage. The conventional fin located in the center of the fuselage was added last when wind tunnel tests revealed the necessity for even more vertical or lateral area.

To provide additional directly stability and, further, to permit location of the C.G. as far aft as practical, substantial sweepback was added to the wing leading edge. This too added problems, for the spanwise drift of the boundary layer in a swept wing is well known. To prevent this drift, which is created by the progressively rearward location of the maximum pressure point of the wing along the span, small "air dams" were added to the XF-85 wing. The boundary layer strikes these dams and its progress is halted near the inboard end of the ailerons, thereby reducing the tendency of the swept wing to create "tip stall" and destroy lateral control when it is most needed. Wing folding presented a problem due to the thin wing section used and the necessity for great strength in the wing in the folded position, a new problem and one not mandatory on ship-board Navy craft, for example. However, the XF-85 is lowered out into the 2,300 mph airstream of the B-36 with its wing folded, and they have to "take" this load while the pilot is straightening the folding wing tip portions and latching them preparatory to casting free of the trapeze.

One problem the XF-85 was permitted to ignore: the tough one of a landing gear. In the thin wings and crowded fuselage of the parasite fighter this would have grown grey hairs on the designers, but instead of a landing gear the barrel-shaped craft uses only a hook. However, much of the headache of a landing gear was transferred to this hook for it had to be made retractable, carry the entire weight of the airplane and support the plane exactly over the C.G.! This problem was a tough one, but it was solved by stowing the hook along the upper nose cowling and designing it to fold backward to a position about over the pilot's head. In this position the XF-85 will hang substantially level from the trapeze. Within the bomb bay, of course, it is snubbed and braced to prevent movement in flight.

The remainder of the airplane was a straightforward job of designing a high performance fighter for the Air Force. The Westinghouse J-34 axial-flow engine was chosen because of its compact size (only 24 in. in diameter). This turbojet engine produces 3000 lbs. static thrust, or the equivalent of about 5000 hp. at the

top speed of the XF-85, and that's a terrific amount of power for such a tiny airplane. The engine is located directly in the center of the fuselage with an air intake in the nose and the jet efflux passing directly from the tail. The pilot literally sits astride the engine.

The cockpit is pressurized, and the odd shape of the fuselage presented a problem in designing a low-drag enclosure for the cockpit. By using a comparatively short windshield (the pilot actually looks forward through the canopy except when sighting his guns) and a large, formed canopy section, a minimum-drag form was created. The canopy is faired into the aft section of the fuselage by a conventional metal enclosure.

The peculiar nature of the tactical operation of the XF-85 places great responsibility on the pilot, for if his bomber is shot down while he is flying he is literally "on his own" since he cannot risk a ground landing of the landing gear-less craft. To aid him, the XF-85 is equipped with an ejection seat and the pilot wears a heated flying suit. He carries a "bail out bottle", an oxygen bottle attached to his suit to provide oxygen during his fall from 30-40,000 ft. to 10-15,000 ft. where he may safely breathe the atmosphere. His parachute is the German-invented "ribbon" type which permits its opening at very high speed without ripping to shreds, as would an ordinary "solid" canopy 'chute.

The McDonnell XF-85 was completed and first ground tests of its engine made in May 1948. It rests on a special dolly in the absence of a conventional landing gear while engine run-up and ground tests are made. It was moved to Muroc Air Force Base in June and final tests made for its first drop. This drop was scheduled to take place from a specially-modified Boeing B-29 *Superfortress*, since the Air Force has no B-36A available for the tests. McDonnell Aircraft modified the B-29 and provided the flight crew for the test. Ground crew and services are provided by Pacific Airmotive Corp. under contract, the first time this arrangement has ever been made.

The XF-85 has a wingspan of 21 ft. and is 15 ft. long. It weighs about 3000 lbs. empty and nearly 5000 lbs. fully loaded. It carries no bombs but is armed by four .50 cal. machine guns mounted in the nose around the periphery of the air intake. It is expected to have a top speed of more than 650 mph at sea level and about 600 mph at 40,000 ft. at which it is dropped. It is capable of climbing to 47,500 ft. and has the phenomenal rate-of-climb of 15,000 ft. per min., surely a match for any enemy jet fighter.

Regardless of the future of the McDonnell XF-85 (and there is presently considerable doubt about further development of both the Convair B-36 and its parasite fighter), the United States has produced another unique contribution to aviation and one of which its creators may well take pride.

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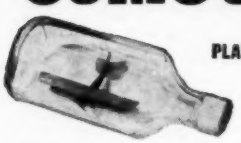

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Air Ways

(*Continued from page* 29)

to include the experts and professionals *and also* any Junior, Senior or Adult contestants who want to compete in the big time. This sounds logical—what do YOU think?

* *

Picture No. 1 submitted by P. H. Stahlhuth (10027 Maplelawn, Detroit 4, Mich.) shows his third successful venture into swept-forward wing design, with a span of 28", and powered by a *Forster* 29. The L.E. is swept forward 20° from the lateral axis, and the C.G. is 25% of the mean chord ahead of the wing root. He found that a symmetrical section at the root and lifting section at the tip gave excellent longitudinal stability. However, Mr. Stahlhuth writes he imagines the lifting tips are a decidedly bad feature of this type wing. The plane weighs 24 oz. and flies around 70 mph. It is a steady and consistent flier and had made many flights *before* the picture was taken.

Rigo Lindgren (Pampusvagen 81, Norrkoping 7, Sweden) submitted No. 2, built from a C-D kit. Controls are movable, and colors are: stabilizer, wings and wheel discs red; fuselage light blue with black letters; rudder has French insignia; cowl olive green; and propeller mahogany. The ship is 4 years old and all colors were sprayed on. The model was not built for flying but handles well when whip-flown.

Russ Porath (414 S. Erie St., De Pere, Wis.) is proud of the model in No. 3, which he jokes was built for the specific purpose of giving free rides to his friends. It has a 10 ft. wingspread and 4½ ft. tail, mounted on a 5 ft. body. The fuselage is completely planked and the wings and tail are semi-sheeted. It is powered by an *Ohlsson 60* with a 14" prop. The only bad feature is the transportation problem.

Brian Hockin's prize winner, No. 4, was designed by his brother Gordon (62 St. Johns Rd. West, Weston, Canada). It recently won a meet with a single flight of 49:43 (Class A-FF).

No. 5 submitted by Donald Jackson (no complete address given) doesn't tell us much about the ship except that it was built while he was on an around-the-world cruise on the *USS Valley Forge*.

No. 6, sent in by Capt. H. M. Bourgeois, was designed and built by O. K. Foster (915 Glendale, San Diego, Calif.). The *Joker* is powered by an Anderson *Spitfire* and does 90 mph, weighs 2 lb. 14 oz. Note "Hap," the hot pilot, in the cockpit with complete radio gear and instrument panel. Plane has a hand rubbed finish of feather grey, trimmed in trumpet gold with carmen red pin stripe. The super finish and details were necessary to win the 85 points given for finish and workmanship in a stunt contest held on the West Coast. The *Joker* is a very stable flier and capable of any maneuver possible with a controliner. Incidentally, the plane is six months old and has over 500 flights (with nary a crackup) to its credit. Photo was taken by Norman T. Van Pelt who is a controline modeler and master photographer.

No. 7 of a *Stinson L5* built from M.A.N. plans, is submitted by Juvenal M. Gonzalez (2647 Renaissance, Station Ana, Manila, Philippines) who writes that this model has been mistaken for a real aircraft. Its performance is like that of an endurance model, and while under power it flies like its big sister ship.

Ian W. Moore (2 Bridge St., Derby, England) submits his first picture (No. 8) to Air Ways, although he has been a

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Drayton Plains, Michigan

MODEL AIRPLANE NEWS reader and builder of models for 14 years. This is the Supermarine S6B, 1931 Schneider Trophy winner, to a scale of 1/2" 1' (1/24). The original machine is in the London Science Museum and he copied most of the detail from it.

Gervais Nolin (321 Green Ave., Osborn, Ohio) sent in No. 9, his third in a series of *Dyna-Jet* models. The engine is enclosed in an aluminum tube; the tube forms the major portion of the fuselage. Air space is provided between engine and tube which overlaps the jet exhaust nozzle by 3/4". Cooling is entirely adequate, even during static operation, and wooden nose, wings and tail surfaces may be attached direct to the cooling tube. Asbestos paper is placed between the wooden and metal parts of the structure because he thought the tube would run hot; however, it runs cool enough so that the paper can be dispensed with. Two points of interest—first, the engine cooling and combustion air intake must be as large and open as possible; second, the fuel tank should be vented to the outside of the fuselage, and the fuel line to engine should terminate inside the tank in its rear portion then run forward to the front of the tank, out through the front of the tank and back to the engine. This helps to eliminate drainage of fuel into the engine or fuselage when the engine is not running. The tank vents outside the fuselage serve the same purpose.

No. 10 shows a model submitted by J. W. Glasscock (1507 Indiana St., Houston 6, Tex.); it is flown tethered on about 75' lines and turns in some very realistic flights. Construction is conventional, the fuselage being covered with hard 1/16" sheet, the wing covered and filled solid out to the point where the landing gear is attached for the extra strength needed in rough landings. The powerplant is the *DeLong 30*, which happened to be the largest and most powerful engine available at the time the ship was built (early 1946) that could be completely cowled. Mr. Glassock believes performance would be even better if the newer *McCoy* were installed.

No. 11, a model built by Harold Buston, was sent in by Delbert R. Baston (190 Middletown Gardens, Muncie, Ind.). The 7' ship is powered by a *Viking Twin* .65 cu. in. engine and features all movable controls, shock-absorbing landing gear, and removable cowling and engine unit. At present the model is equipped to be flown on controlines but the builder has plans for installing radio control.

Ted Morlock (73 Prospect Av., No. Arlington, N. J.) submitted our last picture, No. 12. It is powered by a *Vivell*, and Ted thinks it could really reach the sonic zones if more power were employed. He experimented with using a thin airfoil and very little dihedral and found this ship highly successful.

* *

NEWS OF MODELERS

We endeavor each month to mention (space allowing) as many requests to exchange engines, plans, magazines, etc. as possible. The majority are European model enthusiasts who, if this currency situation wasn't so-o tight, would be as up to date with model planes as your neighbor.

Nevertheless, conditions being what they are, we think it would prove rather interesting if American clubs in particular, and also individuals, would have a general get-together with foreign clubs and model builders. These modelers are handicapped by the monetary difficulty;

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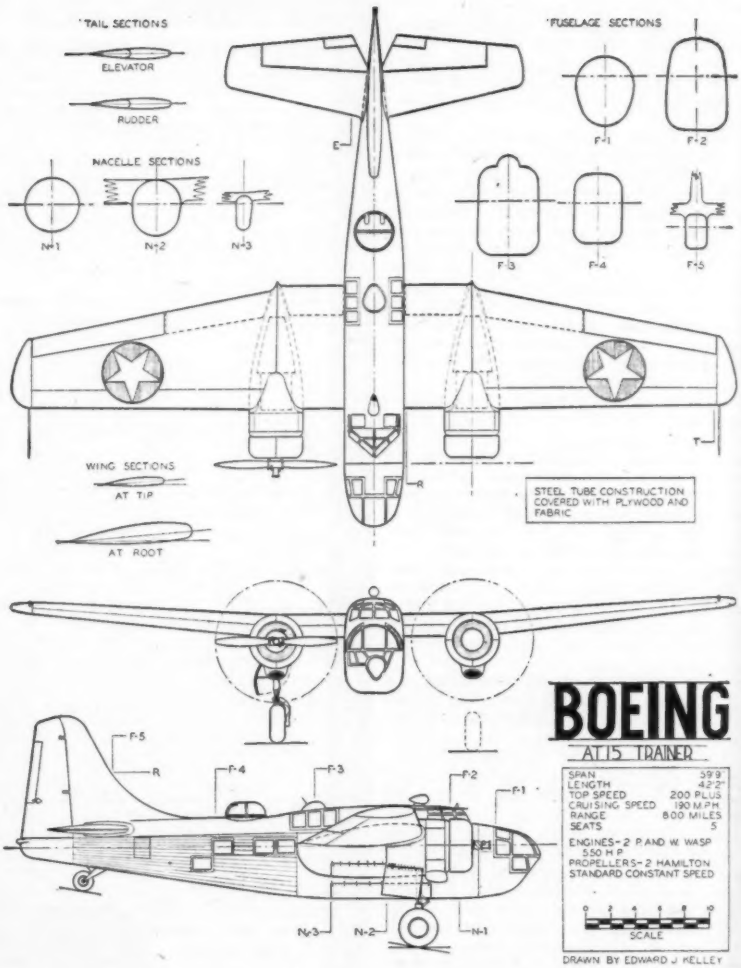

their sole alternative therefore lies in *exchanging*. They would give just "anything" for an American engine—and why not? Let's get the ball rolling! Thanks.

Motors: Brian T. Faulkner, 10 Chestnut Ave., Cheadle, Cheshire, England. Particularly interested in CL Stunt and FF . . . John Calnan, 81 Upland Rd., Sutton, Surrey, England . . . J. G. Parke, 15 Hatfield Rd., Ipswich, Suffolk, England . . . John H. Jorgensen, Hulgaardsvej 56 F, Copenhagen, Denmark . . . A. Woods, 12 Trees Rd., Mount Mervion Park, Blackrock, Co. Dublin, Ireland . . . S. K. Wong, One Kankow Rd., 3d Floor, Kowloon, Hong Kong, China.

Exchange anything and everything: W. A. Williams (22), 5 Edmund St., Little Horton Lane, Bradford, Yorks, England . . . C. R. Sinclair, 20 Bath St., Southport, Lancs, England . . . AC/2 Jones R.A.F., 201 Victoria Rd., New Brighton, Cheshire, England . . . V. Bowyer (36), 54 Repton Way, Croxley Green, Rickmansworth, Herts, England . . . F. H. v.d. Woude, N. W. Kanaal 39, Assen, Holland . . . A. M. J. van Ishoven, Lozana St. 133, Antwerp, Belgium. (His club—*Aeronautics Research Club.*)

Pen-pal seekers: R. J. Millward, Sec. of *Northeast Derbyshire*, M.A.C. (Delph Cottage, Ashover, No. Chesterfield, Derbys, England) would like to correspond with a model club . . . Hans Natsch, Jr. (Rosengasse 3, Zurich 1, Switzerland) 17 to 18 years old . . . Gordon Macdonald, 14 (9807-160 Ave., Howard Beach, L. I, N. Y.), is a controline fiend.

Wolf Rosenthal (Apartado 70, Guatemala City, Guatemala) and his two friends—Billy Risely and Bob Wegan—wrote about the model goings-on there. No mention of their club's name but they do have 30 active members. Mr. Rosenthal writes that they have to get all their

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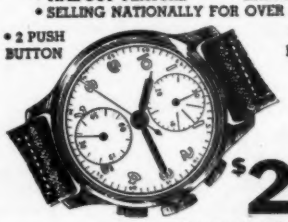

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materials from the States—he is usually elected to bring down, or send down, most of it when he returns each summer from college. The Army men also help. An interesting point is that it is difficult to operate motors in Guatemalan air as Guatemala City is 5,000 ft. above sea level, making the air rather thin.

Particular requests: R. Prentice (105 Kimberley Rd., Edmonton, London N. 18, England) wants to exchange a brand new *Madewell 49* for a new British diesel.

Ing. Jaromir Schindler (Praha XV Podoli, Upodolskehohrbitova 665, Czechoslovakia), an aircraft engineer and model builder for 15 years, is primarily interested in FF and CL gas models and would like to exchange periodicals.

Ernest G. Clark (25 Beechwood Ave., Finchley, London N. 3, England) is chiefly interested in racing boats 30 c.c. and 10 c.c., also speed plans 10 c.c. Recently he converted his boat to surface propulsion.

* *

CLUB NEWS

California

Results of the 9th Annual West Coast Championships, Fresno, Calif., held July 11 (postponed from May 30). *Class A*—Fred Mosier, 7:20; *Class B*—R. N. Spencer, 9:41.1; *Class C*—Percy Oldershaw, 11:17; *Class D*—Elbridge Weymouth, 11:34; Jrs.—Fred Mosier, 10:17.1. Elbridge Weymouth walked off with all the most beautiful trophies; Duke Hubbard won the trophy for the best looking ship; Jack Hiatt of Bakersfield lost his plane. *Class A* FF Gas Sr.—Alexander Locke, Jr., 20:57.2; Jr.—Fred Mosier, 11:27. *Class B* Sr.—Martin Martin, 6:45.4; Jr.—Fred Morgan, 16:30.4; Open—Luther Simonian, 6:56.3. *Class C*—Jack Tiftick, 14:22; *Class D* Open—Shuji Maruko, 10:22.9; Sr.—Carl Randall, 15:02; Jr.—Thomas Diel, 11:23. Rubber Powered Outdoor Cabin Open—Shuji Maruko, :43; Sr.—Bill Hamilton, 10:36.4. Stick Sr.—Henry Meze, 5:53.

Colorado

Results of the Plymouth Eliminations in Pueblo, July 4 and 5: *Rubber CO2 Stick*, Jr.—Billy Thompson 2:46.4; Sr.—Jerry Carlson 13:7.4; Open—Les Walters 5:45.2. *Free Flight Gas*, Jr.—Jim Dolan 1:11.6; Sr.—John Karcher 12:46.6; Open—Jack Wolther 14:21.2. *Control Line Stunt*, Jr.—Alvin Sall; Sr.—Don Yearout; Open—Jack Wolther. *Control Line Speed*—Class A (0 to .30), Jr. and Sr. Combined—Eugene Bartling 58.5 mph; Open—Harold Shaver 110.6. Class B (.30 to .50) Gerry O'Neal 67.5; Open—Bill Crites 111.2. Class C (.50 to .65) Harry Christmas 100.5; Open—Les Walters 126.8.

Indiana

The *Kokomo YMCA Flying Wildcats* is less than a year old and has 23 active members who all build and fly U-Control models. YMCA sponsors the group and provides facilities for club meetings, held first and third Wednesdays. Space to fly is provided by the local School Board (every night and week ends). On July 25, all club members flew exhibition during intermissions of local Motor Midget Speedway races, and the Speedway management cooperated fully. Officers: Pres. Joseph Braun; Vice Pres. William Scott; Secy. Edward Scott; Treas. Everette Doude.

New Jersey

Atlantic City Sky Blazers elected officers for the latter half of '48—Pres. Joseph Bligh; Vice Pres. Andy Trechock; Sec. John Majane; Treas. Wm. Rumbarger. Ideas for a National Park are in the making for an area just north of Atlantic City. If it goes through, the local *Lions Club*

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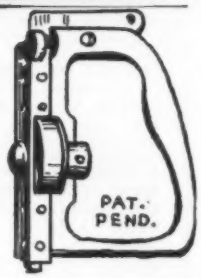

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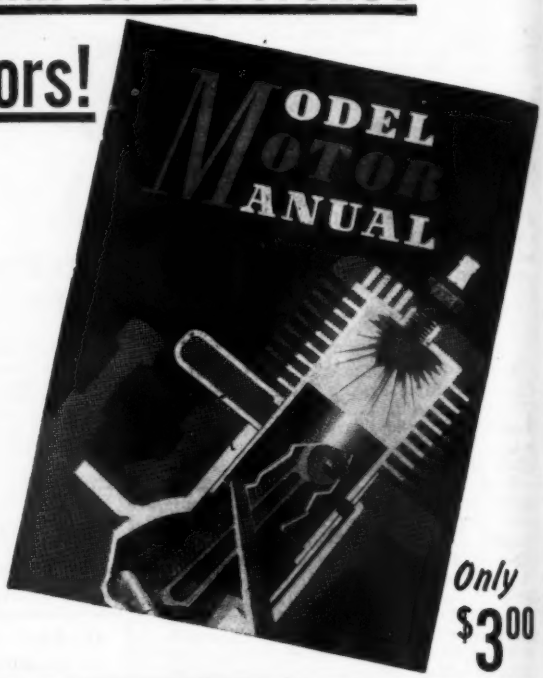

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The publishers commissioned LOUIS GARAMI, widely recognized as the top expert in the field of miniature engines, in collaboration with HOWARD McENTEE (Editor of *Model Airplane News* magazine), to amass all the essential material for such a comprehensive volume. Alan Orthof, one of America's outstanding aeronautic draftsmen, was also engaged to illustrate this book with his exceptionally fine drawings.

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Technical terms are avoided whenever possible, for this book is intended for the beginner as well as the expert, both of whom will find it an invaluable aid in the intelligent use of their powerplants!

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has agreed to fight for construction of a permanent flying model field in the Park. Warner Mahaffey, of *Sky Blazers*, submitted a drafted plan similar to the *Lions*.

New York

Contest Director of *Screamin' Demons*, William K. Johnke, sent in results of the Long Island Invitational Championships held July 25 at Hicksville. Class A Gas—Robert Hatschek, 9:51.3; Class B Gas—Stanley Silverman, 7:39.5; Class C Gas—W. Fay, 10:15.3; Class D Gas—Ronald Thomson, 10:07.6; Combined Classes Gas—Irving Wolk, 6:56.0; CO2—Mrs. Ruth Linnemeyer, 9:47.0; Rubber Combined Classes—John B. Thompson, 12:21.2; Towline Gliders Combined Classes—Murray Feigenbaum, 8:40.2.

Secy. Sheldon J. Portnoy of Cedarhurst Sky Jockeys, L. I., reports his club membership has reached 30, including six father and son pairs. Sheldon—who was Model Airplane Director at Camp Keeyumah, Orson, Pa., this summer—says his Club, strictly control line, has fine facilities at local baseball park for spring and summer activity but is seeking space for winter flying.

The *Cloudhoppers* of Flushing, L.I., adopted as its British counterpart the *Barnsley "Bob-Cats"*, a club in Yorkshire England. (A good idea!!) Recently a collection was made by the *Cloudhoppers* and they purchased a new *Bantam* which they sent to their British friends. In return for the motor, the *Bob-Cats* sent some very fine Wakefield plans—one design by Bob Copland and the other a ship by Warring—and a copy of the *Aeromodeller*. W. C. Kimbell, Sec., reports it was interesting to note that the English hobby dealers make quite a specialty of beautiful 18" hand carved balsa props.

Utah

Results of the 2nd Annual Plymouth International Elimination Meets to select two Utah contestants to attend the Internationals at Detroit are given below. Held in Salt Lake City on July 4 and 5, this was considered the largest model airplane contest ever held in Utah. Free Flight Events: *Class A*—Vic Hotz, 4:50; *Class B*—Tommy Hoopes, 6:13; *Class C*—Norm Christensen, 10:00; *Class D*—Gary Christensen, 4:53. U-Control Events: *Class A*—D. Jacobsen, 69.2; *Class B*—J. R. Bobbitt, 56; *Class C*—Eddy Miltenberger, 75; *Class D*—Ralph Bouy, 109. *Scale*—Jerry Stunf. Precision—A-B, Norm Christensen; C-D, Hal Yeager. Novelty—N. Baumgartner. Sweepstakes, Open—Norm Christensen; Jr. Div.—Eddy Miltenberger. $200 was given the first place winners in the Sweepstakes to attend the Detroit meet.

Canada

Results of the recent Eaton's Annual Model Aircraft Contest in Toronto—*Grand Champion:* Bruce Lester and Jim Templeton, (tie); *Sr. Champion*, Bruce Lester; *Jr. Champion*, Ken Kennedy, Jr. *Rubber powered stick*—Jr.—John Korta 15:30; Sr.—Doug Henshaw 20:6. *Cabin model*—Jr.—Barry Smyth 4:53; Sr.—Lovall Walters 18:41. *CO2 Models*—Open—Jim Templeton 4:12. *Class "A" Gas*—Jr.—Warren Kelley 375.2 secs.; Sr.—Lloyd Brown 1002.8 secs. *Class "B" Gas*—Jr.—Ken Kennedy 493.4 secs.; Sr.—A. K. Bansfield 1634 secs. *Class "C" Gas*—Jr.—John Easton 462.4 secs.; Sr.—Bruce Lester 1999.6 secs. *Controline Class "B" Speed*—Open—Russ Tombs 95.74 mph. *Class "C" Speed*—Open—Alan McTaish and Charlie Petrean 128.57 mph (tied). *Class "D" Speed*—Open—Ray Dolson 128.57 mph. *Controline Scale*—Open—Ralph Bolitsky 179 points. *Controline Stunt*—Open—K. Hawkshaw 321 points.

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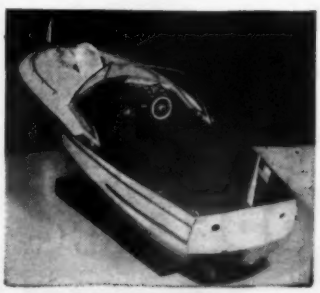

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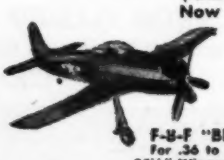

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October 1948
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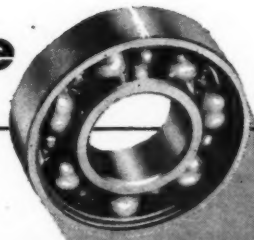

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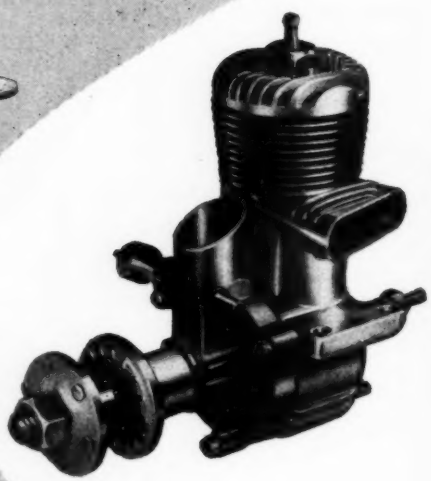

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